User's Guide

PRIMERGY BX900/BX400 Blade Server Systems

Ethernet Connection Blade Module SB6 / SB11a / SB11 IBP Version

English

PRIMERGY BX400/BX900 Connection Blades

Ethernet Connection Blades

PY CB Eth Switch/IBP 1Gb 18/6 (SB6)
PY CB Eth Switch/IBP 1Gb 36/12 (SB11a)
PY CB Eth Switch/IBP 1Gb 36/8+2 (SB11)

User's Guide

IBP version

Edition July 2011

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1 Important Notes

Store this manual close to the device. If you pass the device on to third parties, you should pass this manual on with it. Be sure to read this page carefully and note the information before you open the device. You cannot access the switch blade without first opening the device. Please observe the safety information provided in the “Important Notes” chapter in this user’s guide. Components can become very hot during operation. Ensure you do not touch components when handling the device. There is a danger of burns! The warranty is invalidated if the device is damaged during the installation.

1.1 Information About Boards

To prevent damage to the device or the components and conductors on it, please take great care when you insert or remove it. Take great care to ensure that the board is slotted in straight, without damaging components or conductors on it, or any other components. Be especially careful with the locking mechanisms (catches, centering pins etc.) when you replace the board.

Never use sharp objects (screwdrivers) for leverage. Boards with electrostatic sensitive devices (ESD) are identifiable by the label shown. When you handle boards fitted with ESDs, you must, under all circumstances, observe the following points:

- You must always discharge static build up (e.g., by touching a grounded object) before working.
- The equipment and tools you use must be free of static charges.
- Remove the power plug from the mains supply before inserting or removing boards containing ESDs.
- Always hold boards with ESDs by their edges.
- Never touch pins or conductors on boards fitted with ESDs.

1.2 Compliance Statements

FCC Class A Compliance

This equipment has been tested and found to comply with the limits for a “Class A” digital device, pursuant to Part 15 of the FCC rules and meets all requirements of the Canadian Interference-Causing Equipment Regulations. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in strict accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Fujitsu Technology Solutions is not responsible for any radio or television interference caused by unauthorized modifications of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by Fujitsu Technology Solutions. The correction of interferences caused by such unauthorized modification, substitution or attachment will be the responsibility of the user.

You may use unshielded twisted-pair (UTP) cables for RJ-45 connections – Category 3 or greater for 10 Mbps connections, Category 5 for 100 Mbps connections, and Category 5 or 5e for 1000 Mbps connections.

Wear an anti-static wrist strap or take other suitable measures to prevent electrostatic discharge when handling this equipment.

Industry Canada - Class A

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled “Digital Apparatus,” ICES-003 of the Department of Communications.

Cet appareil numérique respecte les limites de bruits radioélectriques appli- cables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouilleur: “Appareils Numériques,” NMB-003 édictée par le ministère des Communications.

Japan VCCI Class A

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CE Mark Declaration of Conformance for EMI and Safety (EEC)

This information technology equipment complies with the requirements of the Council Directive 89/336/EEC on the Approximation of the laws of the Member States relating to Electromagnetic Compatibility and 73/23/EEC for electrical equipment used within certain voltage limits and the Amendment Directive 93/68/EEC. For the evaluation of the compliance with these Directives, the following standards were applied:

- RFI Emission:
  - Limit class A according to EN 55022:1998
  - Limit class A for harmonic current emission according to EN 61000-3-2/2006
  - Limitation of voltage fluctuation and flicker in low-voltage supply system according to EN 61000-3-3/1995
- Immunity:
  - Product family standard according to EN 55024:1998
  - Electrostatic Discharge according to EN 61000-4-2:1995 (Contact Discharge: ±8 kV, Air Discharge: ±8 kV)
  - Radio-frequency electromagnetic field according to EN 61000-4-3:1995 (80 - 1000 MHz with 1 kHz AM 80% Modulation: 3 V/m)
  - Electrical fast transient/burst according to EN 61000-4-4:2004 (AC/DC power supply: ±1 kV, Data/Signal lines: ±0.5 kV)
  - Surge immunity test according to EN 61000-4-5:1995 (AC/DC Line to Line: ±1 kV, AC/DC Line to Earth: ±2 kV)
  - Immunity to conducted disturbances, Induced by radio-frequency fields: EN 61000-4-6:1996 (0.15 - 80 MHz with 1 kHz AM 80% Modulation: 3 V/m)
  - Power frequency magnetic field immunity test according to EN 61000-4-8:1993 (1 A/m at frequency 50 Hz)
  - Voltage dips, short interruptions and voltage variations immunity test according to EN 61000-4-11:1994 (>95% Reduction @10 ms, 30% Reduction @500 ms, >95% Reduction @5000 ms)
- LVD:
  - EN 60950 (A1/1992; A2/1993; A3/1993; A4/1995; A11/1997)

Do not plug a phone jack connector in the RJ-45 port. This may damage this device. Les raccordeurs ne sont pas utilisé pour le système télépho- nique!

Taiwan BSMI Class A

警告使用者：這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Australia AS/NZS 3548 (1995) - Class A

2 Introduction

The PRIMERGY BX400 Blade Server system is a modular server system that can integrate up to 8 server modules, 4 Connection Blade Modules and two Management Modules (MMB). The Ethernet Connection Blade Module provides networking and Switch functions to PRIMERGY BX400 Blade Server system. The Management Module provides a single point of control for the PRIMERGY BX400 Blade Server system.

Figure: Rear view of BX400 Blade Server System

The PRIMERGY BX900 Blade Server system is a modular server system that can integrates up to 18 server modules, eight Connection Blade Modules and two Management Modules (MMB). The Ethernet Connection Blade Module provides networking and Switch functions to PRIMERGY BX900 Blade Server system. The Management Module provides a single point of control for the PRIMERGY BX900 Blade Server system.

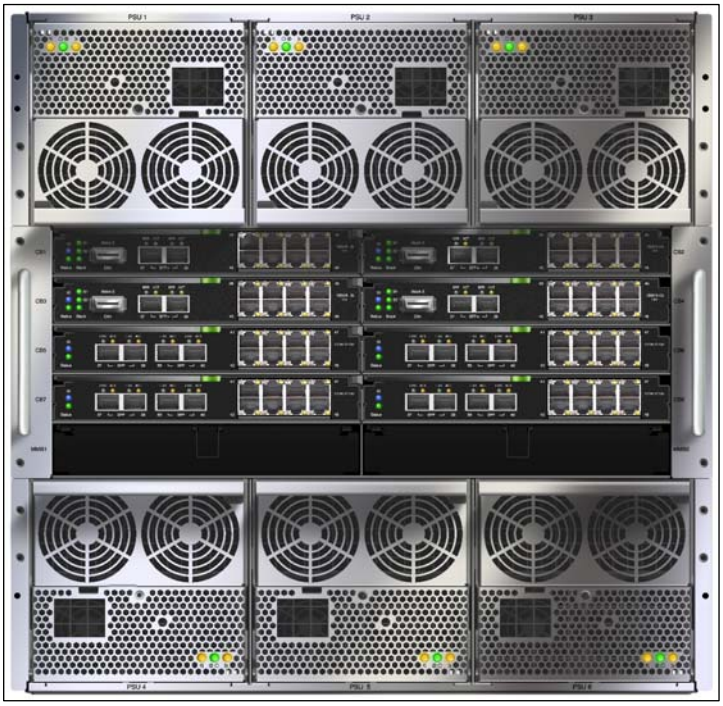


Figure: Rear view of BX900 Blade Server System

Ethernet Connection Blade Module are designed for the Primergy new generation Blade Sever System. There are three type connection blades as follow:

a) SB11 is a 46-port 1GbE with 2 10GbE SFP+ uplinks Layer-2+ stackable Ethernet Connection Blade. The Ethernet Connection Blade configuration is 36 downlink ports to mid-plane and 8 1GbE with RJ45 connectors and 2 10GbE SFP+ for uplink ports. In the BX400 Blade Server System only up to 32 of the 36 downlink ports are utilized. The full 36 downlink ports will be used in BX900 system environment only. There are two HiGig/HiGig+ ports, one is connected to mid-plane, and the other is on the rear panel of the Ethernet Connection Blade providing the stacking function. The Stacking module will support to connect up to 8 SB11 devices.

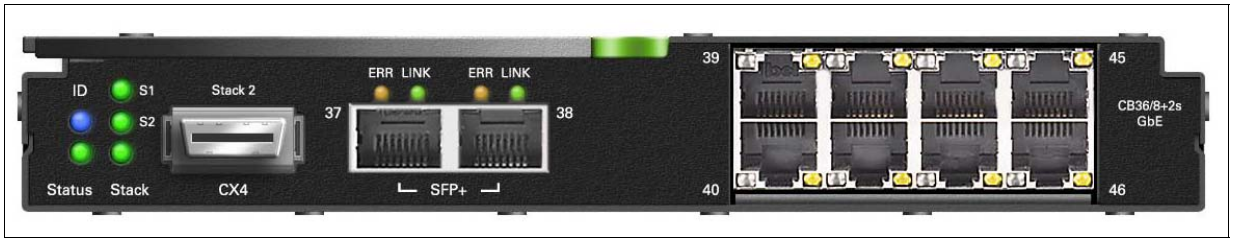


Figure: PRIMERGY BX900 /BX400 GbE Connection Blade 36/8+2 Stacking (SB11) Front Panel

b) SB11a is a 48-port 1GbE with 4 1GbE SFP uplinks Layer-2+ Ethernet Connection Blade. The Ethernet Connection Blade configuration is 36 downlink ports to mid-plane and 8 1GbE with RJ45 connectors and 4 1GbE SFP for uplink ports. In the BX400 Blade Server System only up to 32 of the 36 downlink ports are utilized. The full 36 downlink ports will be used in BX900 system environment only.

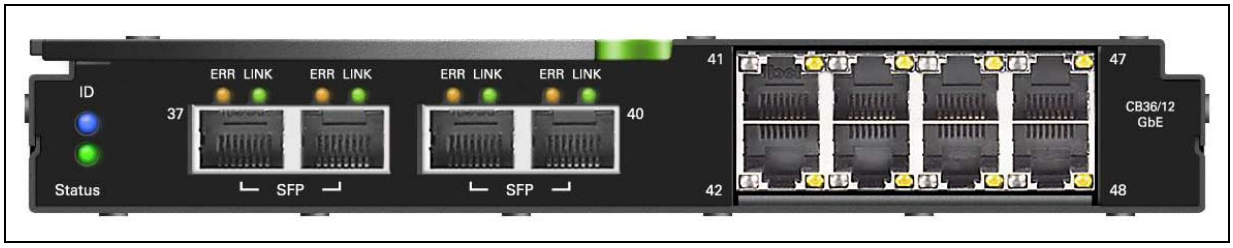


Figure: PRIMERGY BX900/BX400 GbE Connection Blade 36/12 (SB11a) Front Panel

c) SB6 is a 24-port 1GbE Layer-2+ Ethernet Connection Blade. The Ethernet Connection Blade configuration is 18 downlink ports to mid-plane and 6 1GbE with RJ45 connectors for uplink ports. In the BX400 Blade Server System, 16 of the 18 downlink ports provide the dual LAN Ethernet connectivity for each of eight server blades. The remaining 2 downlink ports will be used in BX900 system environment only.

Figure: PY CB Eth Switch/IBP 1Gb 18/6 (SB6) Front Panel

The terminal connection to the device is provided through the MMB board only. For debugging and management purposes, a UART bus of the Ethernet Connection Blade Module is connected to the MMB board. The MMB board can select for management only one connection blade at a time. The Ethernet Connection Blade Module also provides a in-band management interface for MMB management purpose.

2.1 Features of the Ethernet Connection Blade

The Ethernet Connection Blade provides a wide range of advanced performance-enhancing features. Multicast filtering provides support for real-time network applications. Port-based and tagged VLANs, plus support for automatic GVRP VLAN registration provide traffic security and efficient use of network bandwidth. QoS priority queuing ensures the minimum delay for moving real-time multi-media data across the network. Flow control eliminates the loss of packets due to bottlenecks caused by port saturation. And broadcast storm suppression prevents broadcast traffic storms from engulfing the network. Some of the management features are briefly described below.

Head of Line Blocking

Head of Line (HOL) blocking results in traffic delays and frame loss caused by traffic competing for the same egress port resources. HOL blocking queues packets, and the packets at the head of the queue are forwarded before packets at the end of the queue.

Flow Control Support (IEEE 802.3X)

Flow control enables lower speed devices to communicate with higher speed devices, by requesting that the higher speed device refrains from sending packets. Transmissions are temporarily halted to prevent buffer overflows.

Back Pressure Support

On half-duplex links, the receiving port prevents buffer overflows by occupying the link so that it is unavailable for additional traffic.

Jumbo Frames Support

Jumbo frames are frames with an MTU size of up to 9K bytes, and better utilize the network by transporting the same data using fewer frames. The main benefits of this facility are reduced transmission overhead, and reduced host processing overhead. Less frames leads to less I/O interrupts. This facility is typically used for server-to-server transfers.

MDI/MDIX Support

The Ethernet Connection Blade Module automatically detects whether the cable connected to an RJ-45 port is crossed or straight through. Standard wiring for end stations is Media-Dependent Interface (MDI) and the standard wiring for hubs and switches is known as Media-Dependent Interface with Crossover (MDIX).

Auto Negotiation

Auto negotiation allows an Ethernet Connection Blade Module to advertise modes of operation. The auto negotiation function provides the means to exchange information between two devices that share a point-to-point link segment, and to automatically configure both devices to take maximum advantage of their transmission capabilities.

2.1.1 MAC Address Supported Features

MAC Address Capacity Support

The Ethernet Connection Blade Module supports up to 8K/32 MAC addresses for SB11a/SB11. The Ethernet Connection Blade Module reserves specific MAC addresses for system use.

Static MAC Entries

MAC entries can be manually entered in the Bridging Table, as an alternative to learning them from incoming frames. These user-defined entries are not subject to aging, and are preserved across resets and reboots.

Self-Learning MAC Addresses

The Ethernet Connection Blade Module enables automatic MAC address learning from incoming packets. The MAC addresses are stored in the Bridging Table

Automatic Aging for MAC Addresses

MAC addresses from which no traffic is received for a given period are aged out. This prevents the Bridging Table from overflowing.

Port Security

Port security prevents unauthorized users from accessing your network. It allows each port to learn, or be assigned, a list of MAC addresses for devices authorized to access the network through that port. Any packet received on the port must have a source address that appears in the authorized list, otherwise it will be dropped. Port security is disabled on all ports by default, but can be enabled on a per-port basis.

Address Filtering

This Connection Blade provides a packet filter for all traffic entering the CPU port and hence potentially forwarded or routed to the management network. The packet filter is rule/pattern based and constitutes a set of patterns which when matched will DROP the packet, and a further set of patterns which when matched will ACCEPT the packet.

MAC Multicast Support

Multicast service is a limited broadcast service, which allows one-to-many and many-to-many connections for information distribution. Layer 2 Multicast services is where a single frame is addressed to a specific Multicast address, from where copies of the frame are transmitted to the relevant ports.

2.1.2 Layer 2+ Features

IGMP Snooping/MLD Snooping

IGMP Snooping examines IGMP frame contents, when they are forwarded by the Ethernet Connection Blade Module from work stations to an upstream Multicast router. From the frame, the Ethernet Connection Blade Module identifies work stations configured for Multicast sessions, and which Multicast routers are sending Multicast frames.

Port Mirroring

The mirror port mirrors both transmitted and received packets of the probe ports. In Ethernet Connection Blade Module, it supports multiple probe ports and one mirror port. The mirror port mirrors packets of all probe ports no matter whether these packets will eventually be dropped or not. User could set the probe ports and mirror port by using the IBP management function. On setting the probe port and mirror port, users have to make sure both ports are configured to the same speed so that all packets could be successfully mirrored. Physical ports and port-channel ports can be the probe ports.

Broadcast Storm Control

Storm control enables limiting the amount of switching IP packets. Since high rates and continuous traffic can cause flooding on the network. The Storm control mechanism is to prevent the packets from flooding into other parts of the network. Broadcast, multicast, and uni-cast forwarding rates are supported. It provides users with 512 pps (packets per second) forwarding rates, for broadcast, multicast, and uni-cast frames. Any traffic exceeding the configured forwarding rate will be discarded in Ethernet Connection Blade. The storm control is enabled in default and can't be disabled.

Full 802.1Q VLAN Tagging Compliance

IEEE 802.1Q defines an architecture for virtual bridged LANs, the services provided in VLANs and the protocols and algorithms involved in the provision of these services. An important requirement included in this standard is the ability to mark frames with a desired Class of Service (CoS) tag value (0-7).

Link Aggregation

One Aggregated Links may be defined, with up to 8 member ports, to form a single Link Aggregated Group (LAG). This enables:

- Fault tolerance protection from physical link disruption
- Higher bandwidth connections
- Improved bandwidth granularity
- High bandwidth server connectivity

Ethernet Connection Blade supports:

- Up to 6 trunk groups for uplink ports and 18 trunk groups for downlink ports. (LAG for the downlink ports is provided as well as the possibility to combine two ports at one server blade connected to the same Ethernet Connection Blade.
- Load balance with configurable rule: MAC-based and IP-based

LAG is composed of ports with the same speed, set to full-duplex operation. To get better performance on LAG, the flow control is requested to enable on it.

Link Aggregation and LACP

LACP uses peer exchanges across links to determine, on an ongoing basis, the aggregation capability of various links, and continuously provides the maximum level of aggregation capability achievable between a given pair of systems. LACP automatically determines, configures, binds and monitors the port binding to aggregators within the system.

LLDP (Link Layer Discovery Protocol)

The LLDP is a vendor-neutral Layer 2 protocol that allows a network device to advertise its identity and capabilities on the local network.

Called the IEEE 802.1AB Link Layer Discovery Protocol (LLDP), it is an emerging standard which provides a solution for the configuration issues caused by expanding LANs. LLDP specifically defines a standard method for Ethernet network devices such as switches, routers and wireless LAN access points to advertise information about themselves to other nodes on the network and store the information they discover. LLDP runs on all 802 media. The protocol runs over the data-link layer only, allowing two systems running different network layer protocols to learn about each other.

sFlow

sFlowR® is the standard for monitoring high-speed switched and routed networks. sFlow technology is built into network equipment and gives complete visibility into network activity, enabling effective management and control of network resources.

The sFlow monitoring system consists of an sFlow Agent (embedded in a switch or router or in a standalone probe) and a central sFlow Collector. The sFlow Agent uses sampling technology to capture traffic statistics from the device it is monitoring. sFlow datagrams are used to immediately forward the sampled traffic statistics to an sFlow Collector for analysis.

The sFlow Agent uses two forms of sampling: statistical packet-based sampling of switched or routed Packet Flows, and time-based sampling of counters.

Packet Flow Sampling and Counter Sampling are performed by sFlow Instances associated with individual Data Sources within the sFlow Agent. Packet Flow Sampling and Counter Sampling are designed as part of an integrated system. Both types of samples are combined in sFlow datagrams. Packet Flow Sampling will cause a steady, but random, stream of sFlow datagrams to be sent to the sFlow Collector. Counter samples may be taken opportunistically in order to fill these datagrams.

In order to perform Packet Flow Sampling, an sFlow Sampler Instance is configured with a Sampling Rate. The Packet Flow sampling process results in the generation of Packet Flow Records. In order to perform Counter Sampling, the sFlow Poller Instance is configured with a Polling Interval, The Counter Sampling process results in the generation of Counter Records.

The sFlow Agent collects Counter Records and Packet Flow Records and sends them in the form of sFlow datagrams to sFlow Collectors.

UDLD (UnDirectional Link Detection)

UDLD is a lightweight protocol that can be used to detect and disable one-way connections before they create dangerous situations such as Spanning Tree loops or other protocol malfunctions.

The protocol's main goal is to advertise the identities of all the capable devices attached to the same LAN segment and to collect the information received on the ports of each device to determine if the Layer 2 communication is happening in the appropriate fashion. UDLD was implemented to help correct certain assumptions made by other protocols, and in particular to help the Spanning Tree Protocol to function properly so as to avoid the creation of dangerous Layer 2 loops. It has been available on most Cisco Systems switches for several years.

Uplink Sets

The group definition is divided into two independent parts. At first the external / uplink ports are defined in so-called Uplink Sets. In the then following group definitions these Uplinks Sets are used to define the external connection. An “Uplink Set” is defined as a set of 1 to n external (uplink) ports, which is be used in port group definitions to connect a group of server blades to the customer’s LAN. An uplink set has two properties: Port backup, and Link state.

As an Uplink Set is created, two link aggregations will be created at the same time. One link aggregation is for active and the other is for the backup. A port participates to an Uplink Set and it will become the member of the active link aggregation automatically. User could assign a port to participate to the backup link aggregation by manually.

As port backup is enabled on an uplink set, the failover will be executed. That is, the backup LAG will become active link if the active LAG is going down. After the active LAG is resumed to active, the backup LAG will become inactive again.

As link state is enabled on an uplink set, the downlink propagation will be executed. That is, the downlink ports of the associated groups (ex. Port groups, VLAN Port groups.) will be link down if the uplink ports are link down.

Port Groups

The downlink ports of IBP can be combined into Port Groups. Up to 36 port groups are available for the Ethernet Connection Blade with IBP function firmware. Each Port Group could contain internal server ports (INT1-INT36).

The Port Groups must have the following characteristics:

Each Port Group can contain internal server ports (INT1-INT36) and the external connection is defined in uplink set (EXT37-EXT48 for SB11a and EXT37-EXT46 for SB11). It is not mandatory to include an uplink set. A group without a configured uplink set is used only for internal communication. Communication between groups is not possible, nor is traffic from one group visible in another group. Note that by default there is no traffic between ports of different port groups except over Service VLAN and service LAN.

All ports in a Port Group must have the same configuration. Each port in the Port Group is a member of a unique, untagged/tagged VLAN.

Removing Ports from a Port Group will make them to be disabled and can not be enabled by manually. When the port is moved or assigned to participate to a Port Group, the port will be enabled again.

VLAN Port Groups

The major difference to the traditional Port Group feature is that the grouping is defined on VLAN base and that the VLAN groups can share an Uplink Set. Note that even though having identical VLAN Ids, the VLANs in different VLAN port groups are different VLANs.

a) Internal -> external (Blade server sends packet): incoming untagged packets (from blade server) will be tagged with the user defined group VLAN tag and forwarded to the Uplink Set of the port group. The packets leave the uplink(s) as tagged packets, the VLAN tag is not removed at the uplink(s). If the blade is sending tagged packets, they are dropped, except the tag is identical to the defined Service VLAN Id. In this case it is handled according the Service VLAN definition, forwarded to the Service VLAN Uplink Set.

b) External -> Internal (Blade server receives packet): Incoming tagged packets at the IBP uplink are forwarded to the downlink (blade server), according to their group VLAN tag definition. The tag is removed at the downlink port, so that the blade servers are receiving untagged packets. Packets tagged with VLAN Ids other than defined by VLAN groups are dropped at the uplink(s), except those tagged with the Service VLAN Id. They are handled according to Service VLAN group definition (see next section below).

VLAN Port Groups with Native VLAN option

Within the set of VLAN Port Groups sharing the same Uplink Set one VLAN can be optionally defined as “native VLAN”. This changes the tagging behavior at the uplink port for this native VLAN Id to the following:

Incoming untagged packets are not dropped, but are tagged with the native VLAN Id and forwarded to all the downlinks of this VLAN group. Incoming packets tagged with the native VLAN ID are dropped at the uplink. Tagged packets with a VLAN ID that does not match the VLAN id of any other VLAN Port Group defined for this uplink set must be dropped. All outgoing packets for this VLAN group will leave the IBP untagged, and the native VLAN tag is stripped.

Restrictions:

- VLAN port groups must not intercept between themselves in internal ports.
- If two VLAN port groups have a common external port, they must have different VLAN Ids.
- Uplink sets must not intercept between themselves in external ports.
- VLAN port groups must not intercept with “normal” port groups on neither internal nor external ports.
- The LAN ports of all server blades which are member of VLAN port groups must not use VLAN tagging, except the Service VLAN tag.

Service LAN & VLAN

The Service LAN is very similar to the Service VLAN. The Service LAN receives tagged packets from the blade, but the tags are stripped when they leave the uplink (external port). Incoming untagged packets (at the uplink / external port) are tagged and send to the corresponding downlinks / blade server as tagged packets. Incoming tagged packets at uplink (external) ports are dropped.

The Service VLAN receives tagged packets with Service VLAN ID from the blade, and forwards them to uplink (external port) as tagged packets. Incoming tagged packets with Service VLAN ID (at the uplink / external port) are sent to the corresponding downlinks / blade server as tagged packets. Note that (VLAN) Port Group and Service (V)LAN may overlap on the internal ports (downlinks). The untagged packets received from the blade or uplink should obey the rule of the (VLAN) Port Group.

Different Service VLANs may share the same Uplink Set. If the port which is member of the Service VLAN, receives tagged packets with the Service VLAN ID (SVID), those received tagged packets will be forwarding based on Service VLAN. The Service VLANs with different VLAN IDs may overlap in internal ports. The Service VLANs with disjoint uplink sets my have identical SVID. The service VLAN only defines the internal ports to form a group and it can define its external connection by combining Uplink Sets.

Failover Propagation Support

Blade Server has a dual-port network interface controller, and it realizes the redundant LAN ports in case of using NIC management program with LAN teaming function. In order to improve the switching time and realize the “rapid” fail-over of redundant LAN ports, Failover Propagation feature is introduced in SB11/SB11a for uplink ports (including physical port and port-channel port) to speed up the switching of the redundant LAN ports. The failover condition includes link status.

Port Backup Support

Port Backup feature is supported on IBP for redundant uplink ports. Two aggregation groups are created automatically as the Port Group is created. One of the aggregation groups are defined as active

aggregation link, and the other is defined as backup aggregation group. As the active aggregation group is link down, the backup aggregation group will be activated for transmission. After the active aggregation group is link up again, the backup aggregation group will be deactivated.

2.1.3 Management Features of Ethernet Connection Blade Module

The PRIMERGY BX900 Ethernet Connection Blade can either be managed through the console port or through the network (in-band/out-of-band management) with SNMP, TELNET or HTTP protocols**.**

Various Files of Management Operation:

a) There are three types of files for the PRIMERGY BX900 Ethernet Connection Blade:
   - BootROM Image: The images brought up by loader when power up. Also known as POST (Power On Self-Test).
   - Configuration Files: The file stores system configuration information.
   - Operation Code: Executed after system boot-up, also known as Runtime Image.

b) Due to the size of flash memory, the PRIMERGY BX900 supports only two copies for Operation Code and BootROM image respectively and up to 10 copies for Configuration files.

c) Dual function mode of Ethernet Connection Blade Module is supported in PRIMERGY BX900 Server system, user could change the function of Ethernet Connection Blade between “Switch” and “IBP” through the CLI commands after a power recycle.

Duplication of Management file

The PRIMERGY BX900 can copy those three types of files in the following ways.

a) Local files to local file copy: The PRIMERGY BX900 can copy an existed local Configuration File to another local file. Copy exited local Operation Code to another local file is not permitted.

b) Remote TFTP/FTP Server to Local file copy: The PRIMERGY BX900 can support to download Configuration File or Operation Code from remote server to local file.

c) Local file to remote server: The PRIMERGY BX900 can support to upload an existed local Configuration File to the remote server.

d) Running Config to local file copy.

e) Running Config to remote TFTP/FTP server.

f) Local file to Running Config copy.

g) Remote TFTP/FTP server to Running Config copy.

Select Start-up Files

Users can select one of 10 copies for Configuration Files and one of two copies for Operation Codes as start-up file which is used as default boot up configuration and execution image, and the other copy of Configuration File and Operation Code will be used for backup.

Save Configuration as file

Users can save the running configuration as a file for future use. This newly saved configuration file can be selected as start-up file later on. Or users can upload this saved configuration to the remote server for backup**.**

Provision

The PRIMERGY BX900 allows users to select the Configuration files to configure the system. There are two timings to configure system: Start-up and Runtime.

a) Start-up: Select the Configuration File for start-up purpose.

b) Runtime: Users can choose a new configuration file to reconfigure the system while system running, system rebooting is necessary and applied automatically. This function is available for CLI only.

SNMP Alarms and Trap Logs

The system logs events with severity codes and timestamps. Events are sent as SNMP traps to a Trap Recipient List.

SNMP Version 1, Version 2, and Version 3

Simple Network Management Protocol (SNMP) over the UDP/IP protocol. To control access to the system, a list of community entries is defined, each of which consists of a community string and its access privileges. There are 2 levels of SNMP security read-only and read-write.

Web Based Management

With web based management, the system can be managed from any web browser. The system contains an Embedded Web Server (EWS), which serves HTML pages, through which the system can be monitored and configured. The system internally converts web-based input into configuration commands, MIB variable settings and other management-related settings.

Configuration File Download and Upload

The Ethernet Connection Blade Module configuration is stored in a configuration file. The Configuration file includes both system wide and port specific Ethernet Connection Blade Module configuration. Up to 10 configuration files are supported in a system.

Script File Create, Download, Upload and Apply

The configuration of the Ethernet Connection Blade Module configuration can be stored as a script file which are stored and manipulated as text files. In script file, it displays the configuration files in the form of a collection of CLI commands. Script files could be downloaded / uploaded from / to the remote server and the download script files could be applied to the system thought CLI commands.

TFTP/FTP Trivial File Transfer Protocol

The Ethernet Connection Blade Module supports boot image, operation code (runtime image) and configuration upload/download via TFTP/FTP.

Remote Monitoring

Remote Monitoring (RMON) is an extension to SNMP, which provides comprehensive network traffic monitoring capabilities (as opposed to SNMP which allows network Ethernet Connection Blade Module management and monitoring). RMON is a standard MIB that defines current and historical MAC-layer statistics and control objects, allowing real-time information to be captured across the entire network.

Command Line Interface

Command Line Interface (CLI) syntax and semantics conform as much as possible to common industry practice. CLI is composed of mandatory and optional elements. The CLI interpreter provides command and keyword completion to assist user and shorten typing.

Syslog

Syslog is a protocol that allows event notifications to be sent to a set of remote servers, where they can be stored, examined and acted upon. Multiple mechanisms are implemented to send notification of significant events in real time, and keep a record of these events for after-the-fact usage.

SNTP

The Simple Network Time Protocol (SNTP) assures accurate network Ethernet Connection Blade Module clock time synchronization up to the millisecond. Time synchronization is performed by a network SNTP server. Time sources are established by Stratums. Stratums define the distance from the reference clock. The higher the stratum (where zero is the highest), the more accurate the clock. Ethernet Connection blade is support to use the SNTP server got from the DHCP server to do the clock synchronization if the information is presented.

BOOTP Client

BOOTP (Bootstrap Protocol) is used to assign IP address dynamically on the network when the device powers up, instead of using permanently stored parameters. In order to use BOOTP, users have to set up a BOOTP server and define the IP address of the device in the table along with its MAC address. When the device powers up, it sends out BOOTP requests to get the IP address from the BOOTP Server and starts its protocol stack.

DHCP/DHCPv6 Clients

DHCP (Dynamic Host Configuration Protocol) provides individual computers on an IP network to extract their configurations from a server (the 'DHCP server') or servers, in particular, servers that have no exact information about the individual computers until they request the information. DHCP is based on BOOTP and maintains some backward compatibility. The main difference is that BOOTP was designed for manual pre-configuration of the host information in a server database, while DHCP allows for dynamic allocation of network addresses and configurations to newly attached hosts. Additionally, DHCP allows for recovery and reallocation of network addresses through a leasing mechanism.

DNS Client

The DNS protocol controls the **Domain Name System (DNS)**, a distributed database with which you can map host names to IP addresses. When you configure DNS on your IBP, you can substitute the host name for the IP address with all IP commands, such as *ping*, *telnet*, *traceroute*, and related Telnet support operations. To keep track of domain names, IP has defined the concept of a domain name server, which holds a cache (or database) of names mapped to IP addresses. To map domain names to IP addresses, you must first identify the host names, specify the name server that is present on your network, and enable the DNS.

DDNS Client

Provide user to map the host name and its IP address to the specified DDNS server for the DNS resolution.

IPv6 Forwarding and IPv6 support

IPv6 is short for "Internet Protocol Version 6". IPv6 is the "next generation" protocol designed by the IETF to replace the current version Internet Protocol, IP Version 4 ("IPv4"). IPv6 fixes a number of problems in IPv4, such as the limited number of available IPv4 addresses. It also adds many improvements to IPv4 in areas such as routing and network auto-configuration. IPv6 is expected to gradually replace IPv4, with the two coexisting for a number of years during a transition period.

IPv6 IP address for management

The IPv6 IP address for the Ethernet Connection Blade is automatically calculated from its MAC address.

Default Gateway for management ports

Only one default gateway is supported in the system. User could assign the default gateway for in-band management or out-of-band management interface, but not *simultaneously*. If the gateway for the in-band management is set it is only valid for the in-band management. If the user tries to set also the gateway for the out-of-band management there will be an error message saying that the gateway for the in-band management is already set and it is therefore not allowed to configure a second one. If the gateway for the out-of-band management is set it is only valid for the out-of-band management. Again an appropriate error message will be shown if it is tried to configure the in-band management gateway.

If user configure one of these two management ports to get the IP address from DHCP server, the default gateway got from DHCP server will be overridden the existed one. That is, the default gateway will always be valid for the management port which is configured to use DHCP if the IP and default gateway are assigned by DHCP server successfully.

2.1.4 Security Feature

SSL

Secure Socket Layer (SSL) is an application-level protocol that enables secure transactions of data through privacy, authentication, and data integrity. It relies upon certificates and public and private keys. SSL version 3 and TLS version 1 are currently supported.

SSH

Secure Shell (SSH) is a protocol that provides a secure, remote connection to an Ethernet Connection Blade Module. SSH version 1 and version 2 are currently supported. The SSH server feature enables an SSH client to establish a secure, encrypted connection with an Ethernet Connection Blade Module. This connection provides functionality that is similar to an inbound telnet connection. SSH uses RSA Public Key cryptography for Ethernet Connection Blade Module connections and authentication.

Port Based Authentication (802.1x)

Port based authentication enables authenticating system users on a per-port basis via an external server. Only authenticated and approved system users can transmit and receive data. Ports are authenticated via the Remote Authentication Dial In User Service (RADIUS) server using the Extensible Authentication Protocol (EAP).

RADIUS Client

RADIUS is a client/server-based protocol. A RADIUS server maintains a user database, which contains per-user authentication information, such as user name, password and accounting information. For more information, see "Configuring RADIUS Global Parameters".

TACACS+ Client

TACACS+ provides centralized security for validation of users accessing the Ethernet Connection Blade Module. TACACS+ provides a centralized user management system, while still retaining consistency with RADIUS and other authentication processes.

LDAP Client

The **Lightweight Directory Access Protocol**, or **LDAP**, is an application protocol for querying and modifying directory services running over TCP/IP. A directory is a set of objects with similar attributes organized in a logical and hierarchical manner. The most common example is the telephone directory, which consists of a series of names (either of persons or organizations) organized alphabetically, with each name having an address and phone number attached. Due to this basic design (among other factors) LDAP is often used by other services for authentication. In Ethernet Connection Blade, LDAP is used for user authentication.

Denial of Service Enhancements

A denial-of-service attack is an attempt to make a computer’s resource unavailable to its intended users. Here, the Ethernet Connection Blade uses this enhancements to prevent its resource being unavailable to its intended users.

MAC Address Authentication (MAC Address Filter)

Locked Port increases network security by limiting access on a specific port only to users with specific MAC addresses. These addresses are either manually defined or learned on that port. When a frame is seen on a locked port, and the frame source MAC address is not tied to that port, the protection mechanism is invoked.

IP Address Authentication (IP Address Filter)

Management IP address filter designates stations that are allowed to make configuration changes to the Ethernet Connection Blade. Select up to five management stations used to manage the Ethernet Connection Blade. If user choose to define one or more designated management stations, only the chosen stations, as defined by IP address, will be allowed management privilege through the web manager, Telnet session, Secure Shell (SSH) or Secure Socket Layer (SSL) for secure HTTP.

2.1.5 Quality of Service Features

The PRIMERGY BX900 support the mapping of DSCP (Differentiated Service Code Point) to CoS queues. Therefore, packet with different DSCP value can be scheduled to separated CoS queues for different services. DSCP definition is backward compatible with TOS definition. Hence PRIMERGY BX900 also support the mapping of TOS to CoS queues. And packet with difference precedence can be scheduled to different prioritized CoS queues.

802.1p based CoS

On receipt of a frame, Ethernet Connection Blade determines the priority of that frame by examining the 3 priority bits in its VLAN ID defined in 802.1Q. Knowing the priority of the frame, it maps that priority to one of the four output queues available at each output port on which the frame is to be forwarded. Note that users could change the mapping of priorities and output queues via WEB, CLI, or SNMP interfaces. The frames in each output queue will then be forwarded according to a scheduling algorithm.

IP TOS/Precedence/DSCP based CoS

On receipt of a frame, Ethernet Connection Blade determines if the IP TOS, or IP Precedence, or DSCP of the packet matches a predefined value. If it is true, it then examines the policy associated with this class of frames. Users could configure the policy to: send, drop, mark the DSCP field, mark the Precedence field, or commit a specific bandwidth to this class of frames.

Access Control List (ACLs)

Packet filtering can help limit network traffic and restrict network use by certain users or devices. ACLs filter traffic as it passes through an IBP and permit or deny packets crossing specified interfaces or VLANs. An ACL is a sequential collection of permit and deny conditions that apply to packets. When a packet is received on an interface, the IBP compares the fields in the packet against any applied ACLs to verify that the packet has the required permissions to be forwarded, based on the criteria specified in the access lists. The first match decides whether the IBP accepts or rejects the packets. Because the IBP stops testing after the first match, the order of conditions in the list is critical. If no conditions match, the IBP rejects the packet. If there are no restrictions, the IBP forwards the packet; otherwise, the IBP drops the packet. The IBP can use ACLs on all packets it forwards, including packets bridged within a VLAN.

These access lists are supported on Layer 2 interfaces: Standard IP access lists using source addresses and Extended IP access lists using source and destination addresses and optional protocol type Information. The IBP examines ACLs associated with all inbound features configured on a given interface and permits or denies packet forwarding based on how the packet matches the entries in the ACL. In this way, ACLs are used to control access to a network or to part of a network.

An ACL is a sequential collection of permit and deny conditions. The IBP tests packets against the conditions in an access list . The first match determines whether the IBP accepts or rejects the packet. Because the IBP stops testing after the first match, the order of the conditions is critical. If no conditions match, the IBP denies the packet.

The PRIMERGY BX900 supports these types of ACLs or access lists for IP:

- Standard IP access lists use source addresses for matching operations.
- Extended IP access lists use source and destination addresses for matching operations and optional protocol-type information for finer granularity of control.

Standard ACLs are the oldest type of ACL. Standard ACLs control traffic by comparing the source address of the IP packets to the addresses configured in the ACLs. Extended ACLs control traffic by comparing the source and destination addresses of the IP packets to the addresses configured in the ACLs. Rules can be configured to inspect up to six fields of a packet: Source IP, Destination IP, Source L4 Port, Destination L4 Port, TOS Byte, and Protocol Number.

Strict Scheduling for Priority Queue

In addition to WRR, PRIMERGY BX900 also supports strict scheduling ensures that the highest priority packets will always get serviced first, ahead of all other traffic, and that the other three queues will be serviced using WRR scheduling

WRR (Weighted Round Robin)

The PRIMERGY BX900 supports Weighted Round Robin (WRR) scheduling. The WRR queuing algorithm ensures that the lower priority packets are not entirely starved for bandwidth and are serviced without compromising the priority settings administered by the network manager**.**

Differentiated Services

Network resources are apportioned based on traffic classification and priority, giving preferential treatment to data with strict timing requirements according to network management policy. The PRIMERGY BX900 supports the Differentiated Services (DiffServ). The DiffServ is a method of offering quality-of-service treatment for network traffic without the need for a resource reservation protocol. An administration specifically provisions the network equipment to identify the following: The classes of traffic in the network & The QoS treatment the classes of traffic receive.

DiffServ controls the traffic acceptance throughout the DiffServ domain, the traffic transmission throughout the DiffServ domain and the bandwidth guarantee within the network nodes. By controlling the acceptance, the transmission and bandwidth, a policy-based range of services is established.

There are 3 keys QoS building blocks to configure DiffServ. Class, Policy and Services

- Class,
- Policy,
- Services.

On configuring a Class, users specify the matching criterions of a specific traffic class. The criterions provided in Ethernet Connection Blade include

- Destination MAC address,
- Destination IP address,
- Destination layer 4 port,
- IP DSCP,
- IP Precedence,
- IP TOS,
- Protocol,
- Source MAC address,
- Source IP address,
- Source layer 4 port,
- Any.

2.2 Description of Hardware

2.2.1 Port Configurations of Ethernet Connection Blade Module

The PRIMERGY BX400/BX900 Ethernet Connection Blade Module contains

a) SB11: 8 Gigabit Ethernet ports and two 10G SFP+ Ethernet ports for connecting to the network and one internal CX4 HiGig/HiGig+ port and one external CX4 HiGig/HiGig+ ports for stacking purpose,

b) SB11a: 8 RJ45 Gigabit Ethernet ports and 4 SFP Gigabit Ethernet ports for connecting to network.

c) SB6: 6 RJ-45 Gigabit Ethernet ports for connecting to network. It has one Out-of-Band management Ethernet port for connecting PRIMERGY

It has one Out-of-Band management Ethernet port for connecting PRIMERGY BX900 Blade Server management MMB modules.

Physical Ports for SB11

- 36 1-Gigabit downlink ports
- 8 1-Gigabit RJ-45 ports for uplink ports
- 2 10-Gigabit SFP+ ports for uplink
- 2 HiGig/HiGig+ ports for stacking up to 8 devices. One is the internal stacking for the system mid-plane, the other is for the external stack

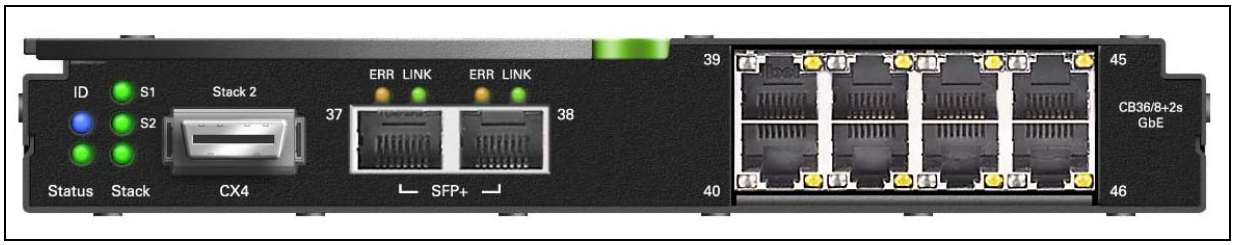


Figure: PRIMERGY BX900 GbE Connection Blade 36/8+2 Stacking (SB11) Front Panel

Physical Ports for SB11a

- 36 1-Gigabit downlink ports
- 8 1-Gigabit RJ-45 ports for uplink ports
- 4 1-Gigabit SFP ports for uplink

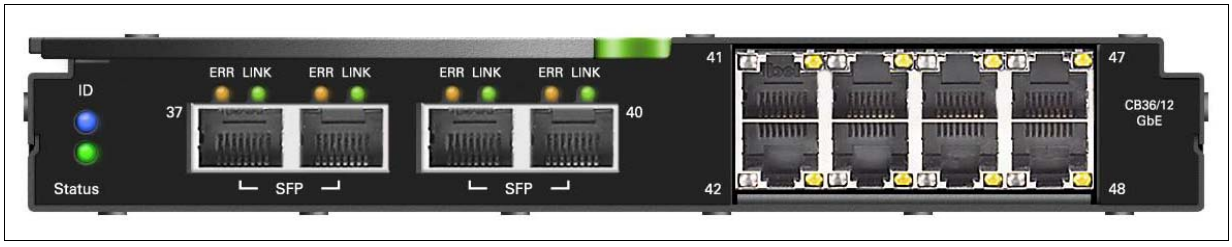


Figure: PRIMERGY BX900 GbE Connection Blade 36/12 Stacking (SB11a) Front Panel

Physical Ports for SB6

- 18 1-Gigabit downlink ports
- 6 1-Gigabit RJ-45 ports for uplink ports

Figure: PRIMERGY BX400 GbE Connection Blade 18/6 (SB6) Front Panel

The RJ-45 Gigabit Ethernet ports can operate at 10, 100 or 1000 Mbps. These ports support auto negotiation, duplex mode (Half or Full duplex), and flow control. The 36 downlink 1 Gigabit Ethernet ports that connect to server modules can only operate at 1000 Mbps, full-duplex.

2.2.2 Ethernet Ports

Uplink Ports

Eight external RJ-45 ports support IEEE 802.3x auto-negotiation of speed, duplex mode, and flow control. Each port can operate at 10 Mbps, 100 Mbps and 1000 Mbps, full and half duplex, and control the data stream to prevent buffers from overflowing. The uplink ports can be connected to other IEEE 802.3ab 1000BASE-T compliant devices up to 100 m (328 ft.) away using Category 5 twisted-pair cable. These ports also feature automatic MDI/MDI-X operation, so user can use straight-through cables for all connections. In addition, the SFP ports on SB11a will support the single and dual mode and the 10G ports on SB11 are the standard SFP+ compliant.

Note – Note that when using auto-negotiation, the speed, transmission mode and flow control can be automatically set if this feature is also supported by the attached device. Otherwise, these items can be manually configured for any connection.

Note – Auto-negotiation must be enabled for automatic MDI/MDI-X pin-out configuration.

Internal Ports

The Ethernet Connection Blade also includes 36 internal 1000BASE-X Gigabit Ethernet ports that connect to the server blades in the chassis. These ports are fixed at 1000 Mbps, full duplex.

2.2.3 Status of LEDs

The front panel contains light emitting diodes (LED) that indicate the status of links, and Ethernet Connection Blade diagnostics.

Port LEDs

Each of uplink port has two LED indicators.

RJ45:

LED	**Color**	**Function**
LED-A (Speed)	Orange	Port Link at 1000 Mbps
	Green	Port Link at 100 Mbps
	Off	Port Link at 10 Mbps
LED-B (Link/Activity)	Green	Network Link
	Green Blink	Network Activity
	Off	No Network Link or port disable

SFP:

LED	**Color**	**Function**
LINK	Off	No Network Link or port disable
	Green	SFP transceiver link status.
	Green Blink	SFP transceiver active status.
ERR	Off	No SFP error
	Orange	SFP transceiver error
	Orange Blink	SFP module not supported

SFP+:

LED	**Color**	**Function**
LINK	Off	No Network Link or port disable
	Green	SFP+ transceiver link status.
	Green Blink	SFP+ transceiver active status.
ERR	Off	No SFP+ error
	Orange	SFP+ transceiver error
	Orange Blink	SFP+ module not supported

General LED (SB6 / SB11a)

There is one Ethernet Connection Blade Module system LED with dual functions, controlled by MMB for error status reporting and blade identification. Different flashing frequencies are used to indicate the different functions. There are two functions, identification and error reporting, with identification having a higher priority than error reporting.

LED	Color	Function
ID	Blue	Identify Connection Blade
	Off	normal
Status	Green	Power On
	Orange Blinking	Connection Blade Failure
	Off	Power Off

General LED (SB11)

There is one Ethernet Connection Blade Module system LED with dual functions, controlled by MMB for error status reporting and blade identification. Different flashing frequencies are used to indicate the different functions. There are two functions, identification and error reporting, with identification having a higher priority than error reporting.

LED	Color	Function
ID	Blue	Identify Connection Blade
	Off	normal
Status	Green	Power On
	Orange Blinking	Connection Blade Failure
	Off	Power Off
S1	Green	Internal Stacking Port1 Link
	Green Blinking	Internal Stacking Port1 Activity
	Off	No Stacking Port1 Link
S2	Green	External Stacking Port2 Link
	Green Blinking	External Stacking Port2 Activity
	Off	No Stacking Port2 Link
Stack	Yellow	Connection Blade is Stack Master
	Yellow Blinking	Connection Blade is not able to perform Master Function
	Green	Connection Blade is Stack Slave
	Green Blinking	Master Election Process active
	Off	Connection Blade is not in a Stack

2.2.4 Supported SFP and SFP+ Vendor List

Supported SFP Modules:

Vendor	Device	Type	Order No. FTS Part No.
Delta Electronics	LCP-1250RJ3SR-S	1000Base-T	S26361-F3986-L1 A3C40110564
Finisar	FCLF-8521-3	1000Base-T	S26361-F3986-L1 A3C4010751
Linksys (Foxconn)	MGBT1 (HP27805-LS)	1000Base-T	--- *1
Methode	DM7041-R	1000Base-T	--- *1
Finisar	FTLF8524P2BNV	1000Base-SX	S26361-F3986-L2 A3C4007613
Opnext	TRF2716AALB200	1000Base-SX	S26361-F3986-L2 A3C4010750
JDSU	PLRXPL-VI-S24-22	1000Base-SX	--- *1

*1 This module cannot be purchased via FTS directly.

Supported SFP+ Modules:

Vendor	Device	Type	Order No. FTS Part No.
Opnext	TRS2000EN-S002	10GBase-SR	S26361-F3986-L3 A3C40107513
Finisar	FTLX8571D3BCL	10GBase-SR	S26361-F3986-L3 A3C40107514
Merge Optics	TRX10GVP2010	10GBase-SR	--- *1
Delta Electronics	LCP-10G3A4EDR	10GBase-SR	--- *1
JDSU	PLRXPL-SC-S43-22-N	10GBase-SR	--- *1
Opnetx	TRS5020EN	10GBase-LR	S26361-F3986-L4 A3C40140191
Opnetx	TRS5021EN	10GBase-LR	S26361-F3986-L4 A3C40140191
Finisar	FTLX1471D3BCL	10GBase-LR	S26361-F3986-L4 A3C40140192

*1 This module cannot be purchased via FTS directly.

2.2.5 Features and Benefits

2.2.6 Connectivity

- 36 internal Gigabit ports for easy network integration of your server cards (SB6: 18 ports).
- 8 external 1000BASE-T Gigabit ports for uplinking to the corporate network (SB6: 6 ports).
- 4 SFP Gigabit ports for uplinking to the corporate network. (SB11a)
- 2 SFP+ 10Gigabit ports for uplinking to the corporate network. (SB11)
- Support for auto MDI/MDI-X on external ports allows any connections to be made with straight-through cable (with auto-negotiation enabled).
- Auto-negotiation enables each port to automatically select the optimum speed (10,100 or 1000Mbps) and communication mode (half or full duplex) if this feature is supported by attached device; otherwise the port can be configured manually.
- IEEE 802.3ad Gigabit Ethernet compliance ensures compatibility with standards-based network cards and switch from vendor.

2.2.7 Performance

- Transparent bridging
- Forwarding modes: Store-and-forward
- Bandwidth: 152Gbps (SB11) / 96Gbps (SB11a) / 48 Gbps (SB6)
- Switching latency: average 8 us for 64-byte frames
- Switching Table with 8K (SB11a, SB6) / 16K (SB11) MAC address entries
- Mean Time Between Failure (MTBF): 175699 hours

2.2.8 Management

- Telnet, SNMP/RMON and Web-based interface.
- VLAN support, port-based or with 802.1Q VLAN tagging on in-band management interface.
- Quality of Service (QoS) supported with four separate queues.
- Multicast Switching base on IGMP (Internet Group Management Protocol) Snooping / MLD Snooping Filtering.
- Broadcast storm suppression.
- Port mirroring.
- Link aggregation.
- Management access security provided with username/password and SNMP community names.

2.3 Notational Conventions

The meanings of the symbols and fonts used in this manual are as follows:

CAUTION	Pay particular attention to texts marked with this symbol. Failure to observe this warning endangers your life, destroys the system, or may lead to loss of data.
“Quotation marks”	Indicate names of chapters and terms that are being emphasized.
NOTICE	This symbol is followed by supplementary information, remarks and tips.

2.4 Target Group

This manual is intended for those responsible technique people for installing and configuring network connections. This manual contains all the information required to configure the Ethernet Connection Blade.

2.5 Technical Data

Electrical data

Operating voltage	+12 VDC @ 2.5 A max (SB11a) +12 VDC @ 3.5 A max (SB11) +12 VDC @ 2.5 A max (SB6)
Maximum current	7.52 A max @ 3.3 VDC 11.8 A max @ 2.5 VDC 24 A max @ 1.25 VDC 7.76 A max @ 1 VDC

National and international standards

Product safety	IEC 60950 / EN 60950 / UL 60950, CSA 22.2 No. 950
Electromagnetic compatibility Interference emission Harmonic current flicker Interference immunity	FCC class A VCCI class A AS / NZS 3548 class A EN 55022 EN 61000-3-2 JEIDA EN 61000-3-3 EN 55024 EN 61000-4-2/3/4/5/6/8/11 BSMI CNS 13438
CE certification to EU directives:	73/23/EEC (low voltage directive) 89/336/EEC (Electromagnetic Compatibility)

Dimensions

Length	276.24 mm
Width	192.63 mm
Height	28.04 mm

Environmental conditions

Environment class 3K2 Environment class 2K2	DIN IEC 721 part 3-3 DIN IEC 721 part 3-2
Temperature: – Operating (3K2) – Transport (2K2)	 0 °C .... 50 °C -40 °C .... 70 °C
Humidity	10 ... 90%

Condensation while operating must be avoided.

3 Network Planning

3.1 Introduction to IBP

The Intelligent Blade Panel Module (IBP) provides a simple Ethernet interface option for connecting the PRIMERGY BX900 Blade Server system to the network infrastructure. The administrative effort and network skills required to connect to the network are minimized. The number and type of configuration options on the IBP are restricted to reduce the initial setup complexity and to minimize the impact on upstream networking devices.

The IBP requires basic administration tasks similar to those required to connect a single multi-linked server to the network. Connecting the Blade Center with up to ten server blades becomes as easy as connecting a single server to the network.

The default network configuration of the IBP is consists of a single, untagged Virtual Local Area Network (VLAN). All of the uplink ports are aggregated together into a static Link Aggregation Group (LAG, or trunk group), which is fully compatible with Cisco Ether Channel technology. This configuration eliminates the need for Spanning Tree Protocol to prevent network loops, since the uplink ports act as a single link.

The IBP provides improved network reliability. All of the uplink ports in each Port Group participates in a static LAG, so if a link fails, the existing traffic is redirected to the other links.

The IBP software permits the copper TX uplink ports to auto-negotiate the speed (10/100/1000Mbps), full duplex and flow control settings of each link (the default setting). You can also fix these port characteristics to specified values. All of the uplink ports in each Port Group must be configured to the same port characteristics.

With Network Adaptor Teaming configured on the server blade Ethernet NIC, the servers can maintain redundant links to multiple IBP within the Blade Server chassis to provide enhanced reliability. The L2 Failover option allows the IBP to disable the server-blade ports when all of its external uplinks are inactive. This causes the Network Adaptor Teaming software to failover to the other IBP(s) in the Blade Server chassis.

3.2 Sample Applications

The Ethernet Connection Blade is designed to consolidate your network core providing high-bandwidth connections between the server chassis and workgroup switches. Some typical applications are described in this section.

3.2.1 Backbone Connection

The IBP can connect to the network backbone or other key sites over high-speed Gigabit Ethernet links, increasing overall bandwidth and throughput.

In IBP, the uplink set could provide high bandwidth connectivity to the corporate backbone, to the Internet, and to other servers.

3.2.2 Making IBP Connections

The IBP supports Port Groups which can be used to organize any group of server blade nodes into separate broadcast domains. Port groups confine broadcast traffic to the originating group, and can eliminate broadcast storms in large networks. The communication between Port Groups is not possible, nor is traffic from one group visible in another group. This provides a more secure and cleaner network environment. The traffic within a port group will be sent as it is received, that is, it is a VLAN transparent.

4 Making Network Connections

The Ethernet Connection Blade connects server boards installed inside the system to a common switch fabric and also provides several external ports for uplinking to external IEEE 802.3ab compliant devices. For most applications, the external ports on the Ethernet Connection Blade will be connected to other switches in the network backbone. It may also be connected directly to Gigabit Ethernet network cards in PCs or servers.

4.1 Connecting to 1000BASE-T Devices

The data ports on the IBP operate at 10 Mbps, 100 Mbps and 1000 Mbps, full and half duplex, with support for auto-negotiation of seed, duplex mode and flow control. You can connect any data port on the IBP to any server or workstation, or uplink to a network device such as another IBP or a router. The 1000BASE-T standard uses four pairs of Category 5 twisted-pair cable for connections up to a maximum length of 100m (328 feet).

For 1000 Mbps operation, you should first test the cable installation for IEEE 802.3ab 1000BASE-T compliance. See “1000BASE-T Cable Requirements” for more information.

1. Prepare the devices you wish to network. For 1000 Mbps operation, make sure that servers and workstations have installed 1000BASE-T network interface cards. Other network device should have RJ-45 ports that comply with the IEEE 802.3ab 1000BASE-T standard.
2. Prepare shielded or unshielded twisted-pair cables (straight-through or crossover) with RJ-45 plugs at both ends. Use 100-ohm Category 5 (Category 5e or better is recommended) cable for 1000 Mbps Gigabit Ethernet connections.
3. Connect one end of the cable to the RJ-45 port on the other device, and the other end to any available RJ-45 port on the IBP. When inserting an RJ-45 plug, be sure the tab on the plug clicks into position to ensure that it is properly seated.

DO NOT plug a phone jack connector into any RJ-45 port. This may damage the Ethernet Connection Blade. Instead, use only twisted-pair cables with RJ-45 connectors that conform to FCC standards.

For 1000 Mbps operation, all four wire pairs in the cable must be connected. When auto-negotiation is enabled, the 1000BASE-T ports support the auto MDI/MDI-X feature, which means that at any operating speed (10, 100, or 1000 Mbps), either straight-through device. Make sure each twisted-pair cable does not exceed 100 meters (328 feet). Note that auto-negotiation must be enabled to support auto MDI/MDI-X.

4.2 1000BASE-T Cable Requirements

All Category 5 UTP cables that are used for 100BASE-TX connections should also work for 1000BASE-T, providing that all four wire pairs are connected. However, it is recommended that for all critical connections, or any new cable installations, Category 5e (enhanced Category 5) cable should be used. The Category 5e specification includes test parameters that are only recommendations for Category 5. Therefore, the first step in preparing existing Category 5 cabling for running 1000BAST-T is a simple test of the cable installation to be sure that it complies with the IEEE 802.3ab standards.

4.2.1 Cable Testing for Existing Category 5 Cable

Installed Category 5 cabling must pass test for Attenuation, Near-End Crosstalk (NEXT), and Far-End Crosstalk (FEXT). This cable testing information is specified in the ANSI/TIA/EIA-TSB-67 standard. Additionally, cables must also pass test parameters for Return Loss and Equal-Level Far-End Crosstalk (ELFEXT). These tests are specified in the ANSI/TIA/EIA-TSB-95Bulletin, “The Additional Transmission Performance Guidelines for 100 Ohm 4-Pair Category 5 Cabling”.

Note that when testing your cable installation; be sure to include all patch cables between IBP(s) and end devices.

4.2.2 Adjusting Existing Category 5 Cabling for 1000BASE-T

If your existing Category 5 installation does not meet one of the test parameters for 1000BASE-T, there are basically three measures that can be applied to try and correct the problem:

1. Replace any Category 5 patch cables with high-performance Category 5e cables.
2. Reduce the number of connectors used in the link.
3. Reconnect some of the connectors in the link.

4.2.3 1000BASE-T Pin Assignments

1000BAST-T ports support automatic MDI/MDI-X operation, so you can use straight-through cables for all network connections to PCs or servers, or to other switches. (Auto-negotiation must be enabled to support MDI/MDI-X.)

The table below shows the 1000BASE-T MDI and MDI-X port pin outs. These ports require that all four pairs of wires be connected. Note that for 1000BASE-T operation, all four pairs of wires are used for both transmit and receive.

Use 100-ohm Category 5 or 5e unshielded twisted-pair (UTP) or shielded twisted-pair (STP) cable for 1000BASE-T connections. Also be sure that the length of any twisted-pair connection does not exceed 100 meters (328 feet).

Pin	MDI Signal Name	MDI-X Signal Name
1	Transmit Data plus (TD1+)	Transmit Data plus (TD2 +)
2	Receive Data minus (RD1-)	Receive Data minus (RD2-)
3	Transmit Data plus (TD2+)	Transmit Data plus (TD1+)
4	Transmit Data plus (TD3+)	Transmit Data plus (TD4+)
5	Receive Data minus (RD3-)	Receive Data minus (RD4-)
6	Receive Data minus (RD2-)	Receive Data minus (RD1-)
7	Transmit Data plus (TD4+)	Transmit Data plus (TD3+)
8	Receive Data minus (RD4-)	Receive Data minus (RD3-)

Pin	MDI Signal Name	MDI-X Signal Name
1	Transmit Data plus (TD1+)	Transmit Data plus (TD2 +)
2	Receive Data minus (RD1-)	Receive Data minus (RD2-)
3	Transmit Data plus (TD2+)	Transmit Data plus (TD1+)
4	Transmit Data plus (TD3+)	Transmit Data plus (TD4+)
5	Receive Data minus (RD3-)	Receive Data minus (RD4-)
6	Receive Data minus (RD2-)	Receive Data minus (RD1-)
7	Transmit Data plus (TD4+)	Transmit Data plus (TD3+)
8	Receive Data minus (RD4-)	Receive Data minus (RD3-)

Table: 1000BASE-T Pin outs

5 Configuring Ethernet Connection Blade Module

This section contains information about Ethernet Connection Blade Module unpacking, installation, and cable connections.

5.1 Overview

The Ethernet Connection Blade Module is inserted in the PRIMERGY BX900 Blade Server which is a modular server system that can integrates up to 18 processor blades and eight Ethernet Connection Blade Modules.

Package Contents

While unpacking the Ethernet Connection Blade, ensure that the following items are included:

- The Ethernet Connection Blade Module
- Documentation CD

Unpacking the Ethernet Connection Blade Module

To unpack the Ethernet Connection Blade Module:

Before unpacking the Ethernet Connection Blade Module, inspect the package and report any evidence of damage immediately.

And ESD strap is not provided, however, it is recommended to wear one for the following procedure.

1. Open the container.
2. Carefully remove the Ethernet Connection Blade Module from the container and place it on a secure and clean surface.
3. Remove all packing material.
4. Inspect the Ethernet Connection Blade Module for damage. Report any damage immediately.

The illustrations in this document might differ slightly from actual Ethernet Connection Blade and Chassis.

5.2 Connecting the Ethernet Connection Blade Module

Before configuring the Ethernet Connection Blade Module, PRIMERGY BX900 Blade Server console port must be connected to the Ethernet Connection Blade Module. To connect PRIMERGY BX900 Blade Server console port to Ethernet Connection Blade Module, perform the following:

1. Mount the Ethernet Connection Blade Module

One the console monitor the MMB application displays a login screen.

The Ethernet Connection Blade Module bootup screen is displayed.

```
                        Welcome to Management Blade 1.30J


<Username>:
```

2. Enter the provided username and password. The console menu is displayed.

```
                        Welcome to Management Blade 1.30J


<Username>:admin
<Password>:*****


+-------------------------------------------------------------------------+
|                              Console Menu                    page_root
+-------------------------------------------------------------------------+
(1) Management Agent
(2) Emergency Management Port
(3) Console Redirection
(4) TFTP update
(5) Logout
(6) Reboot Management Blade
(7) System Information Dump
(8) Command Line Interface
(9) Account Management
Enter selection: 3
```

3. Select (3) Console Redirection. The Console Redirection Table is displayed.

```
+------------------------------------------------------------------------------+
|             Console Redirection Table                          page_3
+------------------------------------------------------------------------------+
(1) Console Redirect Connection Blade
(2) Set Return Hotkey , Ctrl+(a character) : Q
(3) Set Console Redirection Timeout              : 900
Enter selection or type (0) to quit: 1
```

4. Select (1) Console Redirection Connection Blade. The Console Redirect Connection Blade is displayed.

```
+------------------------------------------------------------------------------+
|             Console Redirect Connection Blade                  page_3_1
+------------------------------------------------------------------------------+
(1) Console Redirect Connection Blade-1
(2) Console Redirect Connection Blade-2
Enter selection or type (0) to quit: 1
```

5. Select which Connection Blade you want to redirect. Then press enter to check if the console redirection is successful.

```
Press <Ctrl+Q> Return Console Menu


(BX900-CB1)#
```

5.3 Start up and Configuration the Ethernet Connection Blade Module

It's important to understand the Ethernet Connection Blade Module architecture when configuring the Ethernet Connection Blade Module. The Ethernet Connection Blade Module has two types of ports. One type is for interfacing the Ethernet Connection Blade Module with PRIMERGY BX900 Blade Server, and the other type are regular Ethernet ports used for connecting PRIMERGY BX900 Blade Server to the external network.

The Ethernet Connection Blade Module is connected to PRIMERGY BX900 Blade Server (Management Board) MMB through 36 internal ports called the Internal Ports. The maximum link speed through the Internal Ports is 1 Gigabit per port. The port configuration ID's are g1 to g36. To connect the Ethernet Connection Blade Module to the external network there are eight PHY based ports and 4 SFP 1Gigabit or 2 SFP+ 10 Gigabit ports (depended on the platform type) called the External Ports.

The default configuration of the internal and external ports is as follows:

External Ports	
Function	**Default Setting**
Flow Control	Off (disabled on ingress)
Back Pressure	Off (disabled on ingress)
Auto Negotiation	Enabled

Table: Default configuration for external ports.

Internal Ports	
Function	**Default Setting**
Speed and duplex auto negotiation	One Gigabit/Full speed
Flow Control	Disabled
Auto negotiation of Flow Control	Disabled

Table: Default configuration for internal ports.

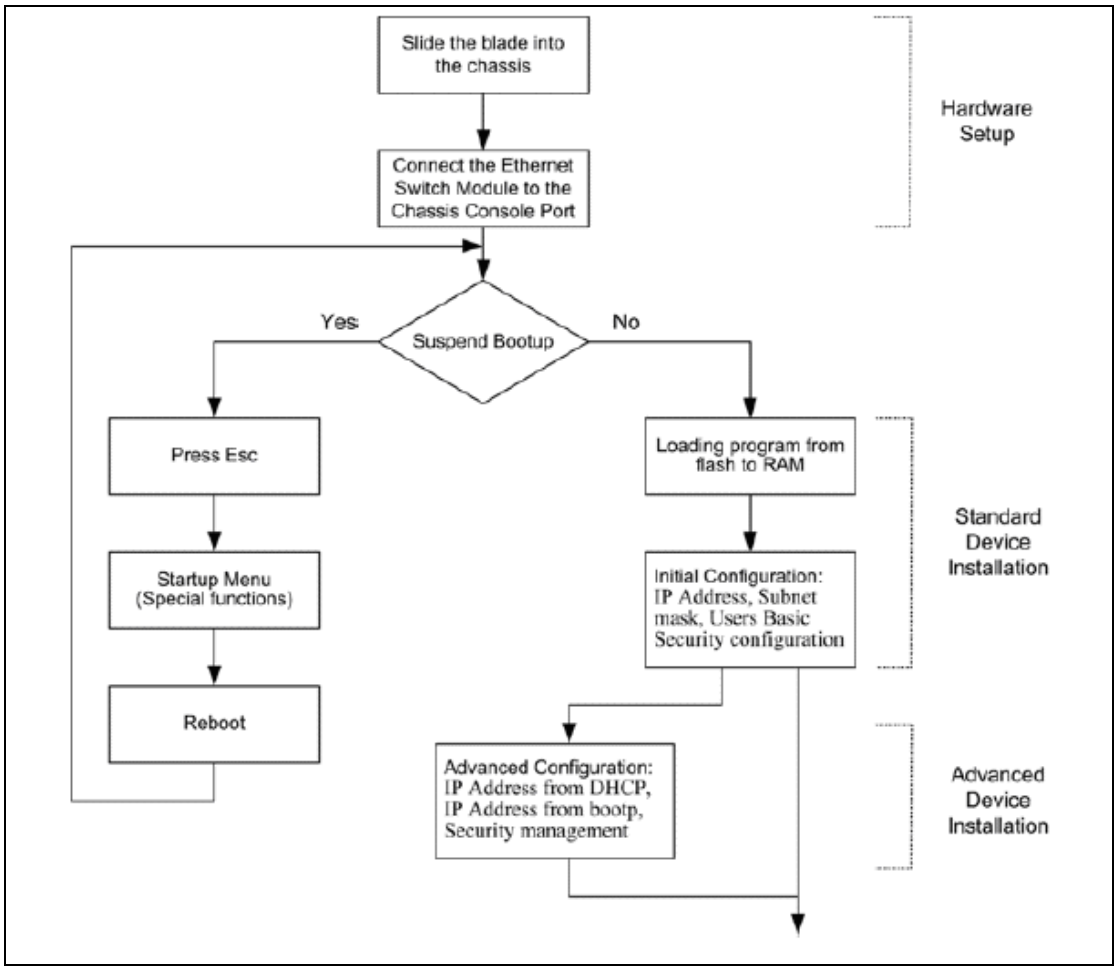

Slide the blade into the chassis
Connect the Ethernet Switch Module to the Chassis Console Port
Hardware Setup
Yes
Suspend Bootup
No
Press Esc
Startup Menu (Special functions)
Reboot
Loading program from flash to RAM
Initial Configuration: IP Address, Subnet mask, Users Basic Security configuration
Standard Device Installation
Advanced Configuration: IP Address from DHCP, IP Address from bootp, Security management
Advanced Device Installation

Figure: Installation and Configuration Flow

5.4 Configuring the Terminal

To configure the device, the station must be running terminal emulation software. Ensure that Ethernet Connection Blade Module is correctly mounted and is connected to the chassis serial port. Ensure that the terminal emulation software is set as follows: Connect to the serial port of PRIMERGY BX900 Management Blade and use console redirection function to get the console access of Ethernet Connection Blade.

1. Set the data format to 115200 baud rate, 8 data bits, 1 stop bit and no parity.
2. Set Flow Control to none.
3. Under Properties, select VT100 for emulation mode.
4. Select Terminal keys for Function, Arrow, and Ctrl keys. Ensure that the setting is for Terminal keys (not Windows keys).

For accessing Ethernet Connection Blade Module from terminal perform following steps:

1. Connect your terminal to the serial port of the Management Blade.
2. Use console redirection function provided on Management Blade to get the access of the desired Ethernet Connection Blade.
3. Press <Enter> few times to ensure that terminal connection is successful.

5.5 Booting Device

When the Ethernet Connection Blade Module is connected to the local terminal, the Ethernet Connection blade Module goes through Power On Self Test (POST). POST runs every time the device is initialized and checks hardware components to determine if the device is fully operational before completely booting. If a critical problem is detected, the program flow stops. If POST displayed on the terminal and indicate test success or failure.

As the device boots, the boot-up test first counts the device memory availability and then continues to boot. The following screen is an example of the displayed POST.

```
---------- Performing Power-On Self Tests (POST) ----------
   System SDRAM Test.....……….....PASS
   CPU Self Test.....……..PASS
   UART Loopback Test.....……..PASS
   Flash Memory Initialize.....……..PASS
   Flash Memory Checksum Test.....……...PASS
   PCI Bus Initialize and Test.....……..PASS
   System Timer Test.....……...PASS
   I2C Bus Initialize and Test……...PASS
   Ethernet Physical Test……..PASS
----------Power-On Self Test Completed----------


Press [Ctrl+B] to enter back door or any key to continue…
```

The boot process runs approximately 60 seconds.

The auto-boot message displayed at the end of POST (see the last line) indicates that no problems were encountered during boot. During the **BootROM Back Door Command Line Interface** can be used to run special procedures. To enter the **BootROM Back Door CLI**, please press **Ctrl+B** within the first two seconds after the auto-boot message is displayed. If the system boot process is not interrupted by pressing **Ctrl+B**, the process continues decompressing the loading the code into RAM. The code starts running from RAM and the list of numbered system ports and their states (up or down) are displayed. After the device boots successfully, a system prompt is displayed which is used to configure the device. However, before configuring the device, ensure that the latest software version is installed on the device. If it is not the latest version, download and install the latest version is necessary. For more information on downloading the latest version see the section “Software Download”.

5.6 Software Download

5.6.1 In BootROM Back Door CLI

Software Download Using Xmodem Protocol

The software download procedure is performed when a new version must be downloaded to replace the corrupted files, update or upgrade the system software (system and boot images).

To download software from the BootROM CLI:

1. Form the **BootROM CLI** prompt input the following command: xmodem –rb <filename>
2. When using the HyperTerminal, click **Transfer** on the HyperTerminal Menu Bar.
3. In the **Filename** field, enter the file path for the file to be downloaded.
4. Ensure that the Xmodem protocol is selected in the **Protocol** field.
5. Press **Send**. The software is downloaded.

Erasing the Device Configuration

1. From the **BootROM CLI** prompt input the following command:

   delete <configuration filename>

   The following message is displayed:

   Are you sure you want to delete <configuration filename> (y/n)?
2. Press Y. The following message is displayed.

   Updating partition table, please wait … Done

   Image file <configuration filename> deleted.
3. Repeat the device initial configuration.

Boot Image Download

Loading a new boot image using Xmodem protocol and programming it into the flash updates the boot image. The boot image is loaded when the device is powered on. A user has no control over the boot image copies. To download a boot image using xmodem protocol:

1. Ensure that the file to be downloaded is saved on the PC host (the image file).
2. Enter **BootROM> dir –l** command to verify which software version is currently running on the device. The following is an example of the information that appears:

```
BootROM > dir -l
type          zip     def   date            version        name
--------------------------------------------------------------------------------
loader        none    yes   2008/12/14   0.4              sb11a-l-0.4.1214.bin
bootrom       gzip    yes   2008/12/14   0.4              sb11a-b-0.4.1214.biz
```

```
runtime      gzip   yes   2008/12/10   0.5          sb11a-ibp-r-0.5.1210.biz

Total: 3 files.
```

3. From the **BootROM CLI** prompt input the following command: xmodem –rb <filename>
4. When using the HyperTerminal, click **Transfer** on the HyperTerminal Menu Bar.
5. In the **Filename** field, enter the file path for the file to be downloaded.
6. Ensure that the Xmodem protocol is selected in the **Protocol** filed.
7. Press **Send**. The software is downloaded.
8. Enter the reset command. The following message is displayed:

```
BootROM> reset
Are you sure you want to reset the system (y/n)? y

System Resetting…
```

9. Entry Y. The device reboots.

5.6.2 In Operation Code CLI

Software Download through TFTP/FTP Server

This section contains instructions for downloading device software through a TFTP/FTP server. The TFTP/FTP server must be configured before beginning to download the software.

System Image Download

The device boots and runs when decompressing the system image from the flash memory area where a copy of the system image is stored. When a new image is downloaded, it is saved in the other area allocated for the other system image copy. On the next boot, the device will decompress and run the currently active system image unless chosen otherwise.

To download a system image through the TFTP/FTP server:

1. Ensure that an IP address is configured on one of the device ports and pings can be sent to a TFTP/FTP server.
2. Make sure that the file to be downloaded is saved on the TFTP/FTP server (the image file).
3. Enter **(CB)#show version** command to verify which software version is currently running on the device. The following is an example of the information that appears:

```
(CB) #show version
 Serial number              :SQ823LW00114
 Hardware Version           :1.0
 Number of ports            :48
 Label Revision Number      :1
 Part Number                :A3C40096531
 Machine Model              :PY CB Eth Switch/IBP 1Gb 36/12
 Loader version             :0.7
 Operation code version     :0.40
 Boot rom version           :0.9
```

4. Enter **(CB)#whichboot** command to verify which system image is currently active. The following is an example of the information that appears:

```
Boot-System..... Switch
Next Booting Mode..... Switch

                file name          file type    startup   size (byte)
--------------------------------  ----------------------  -------  -------------
  sb11a-b-0.9.0212.biz      Boot-Rom image    Y           373327
               default.cfg    Config File       Y           19204
sb11a-ibp-r-0.40.0227.biz   Operation Code    Y          8233676
```

5. Enter **(CB)#copy tftp://{tftp address}/{file name} image {file name}** or **copy ftp://{ftp address}/{file name} image {file name}** command to copy a new system image to the device. The following message is displayed:

```
(CB) #copy tftp://192.168.2.1/sb11a-sw-r-0.40.0227.img image sb11a-sw-r-0.04.0227.biz


Mode..... TFTP
Set TFTP Server IP..... 192.168.2.1
TFTP Path..... ./
TFTP Filename..... sb11a-sw-r-0.40.0227.img
Data Type..... Code
Destination Filename..... sb11a-sw-r-0.04.0227.biz


Management access will be blocked for the duration of the transfer
Are you sure you want to start? (y/n)
```

6. Press Y. When the new image is downloaded, it is saved in the area allocated for the other copy of system image.
7. Select the image for the next boot by entering the **boot-system** command. After this command, enter **(CB)#whichboot** command to verify that the copy indicated as a parameter in the boot-system command is selected for the next boot.
8. Enter the reload command. The following message is displayed:

```
(CB)# reload
Are you sure you would like to reset the system? (y/n) y
```

9. Enter y, the device reboots.

Only 2 runtime images can be stored in a system.

5.7 Switching the Software Booting Mode

In Ethernet Connection Blade, it has bundled two kinds of firmware version with three operational modes, including switch, End-Host-Mode and IBP mode. It could only be running in one mode at a time. In order to run the other mode, you have to change the booting mode and reboot the Ethernet Connection Blade.

To change the software mode:

1. Enter **(CB)#boot-system mode** command to specify which software version running on the device after next reboot.
2. To change next booting software mode to IBP, use **(CB)#boot-system mode IBP**
3. To change next booting software mode to Switch, use **(CB)#boot-system mode switch**
4. To change next booting software mode to End-Host-Mode, use **(CB)#boot-system mode EHM**

The change will be affected through a power cycle or a software reboot cycle.

The Connection blade will boot with the default startup configuration stored for the respective firmware. e.g. IBP boots with ibp configuration and switch boots with switch configuration. There is no relation between these two configurations.

6 Understanding Stacking Feature

6.1 Introduction

A stacking function is a group set of IBP(s) connected through Infiniband CX4 interface of the HiGig/HiGig+ ports. One of the IBP(s) controlled the operation of the stack modules is called the stack master. Other IBP(s) are belonging to the stack members of the stack group system.

Stacking feature provides high port density while simplifying management by providing a single point of management for all IBP(s) in the stack. All of the IBP(s) within a stack act as one IBP product. A single IP address is required for CLI/Web/SNMP management, while a single console/telnet session is capable of managing the entire stack. The following lists the advantages of stacking of SB11 IBP.

1. Reduce the number of IP addresses needed in a network.
2. Simplify management of small groups or wiring closets while scaling their network to handle increased network bandwidth demand
3. Provide high availability function; if any single unit fails or a cable is accidentally disconnected; other units in the stack remain operational, without interruption. (Notes 1)
4. A new unit joins the stack system will come up appropriately without resetting the stack (Notes 2).
5. A unit leaves the stack system will be removed appropriately without resetting the stack (Notes 2).
6. Auto master election.
7. Auto configuration/script synchronization.
8. Easy firmware upgrade for whole stack.

The stacking software configures each device tables and registers to support all switching functions, for example, switching, link aggregation, port monitoring, spanning tree protocol, VLAN, etc. The entire stack will appear as a single IBP. In order for a stacked system to function properly, the individual chips have to be programmed consistently with each other. As SB11 devices are inserted into the stack or removed from the stack, it is imperative that all of the chips are reconfigured dynamically so the system continues to operate. This is accomplished by several software protocols that discover, monitor the topology, and configure the chips in the stack.

1. The stack should be configured with the full bandwidth connections (ring topology)
2. The operation of the stack continues uninterrupted during membership changes unless you remove the stack master or you add powered-on standalone IBP.

6.2 Stacking Function Features Overview

PRIMERGY BX900 GbE Connection Blade 36/8+2 Stacking (SB11) provides the following stacking function features:

1. Only stacking with ring topology will be supported for redundant configuration. The redundant configuration function must keep the ring topology stacking system to backup maintenance.
2. A stack contains at most eight member switches.
3. Stack is managed as a single switch and has a single IP address.
4. The stack will negotiate a master switch automatically.
5. A standby switch will be configured manually or be auto-assigned by the stack master.
6. If the stack master becomes unavailable, the standby switch will become the stack master automatically without any election process.
7. Self configuration and self management.
8. A switch can be added to and removed from the stack without interrupting the other switches in the stack except for adding powered on switch.
9. LAG is possible with ports of the entire stack and not restricted to a single switch.
10. Unique configuration entry is from stack master.
11. Unique firmware upgrade entry is from stack master.
12. Master role could be transferred form one unit to the other unit in the stack.
13. A status LED is supported to indicate which device is the stack master.

6.3 Stack Master Election Processes

The stacking function of SB11 is done through the two dedicated 12-Gigabit HiGig+ ports. One dedicated is connected to mid-plane (called internal stacking link), and the other is connected to front panel (called external stacking link). For easy management as a single object, a unique configuration entry should be supported. Therefore, a unit will be elected to act as a stack master. The following section will be described as the considerations for the stack master election processes.

The considerations of master election are listed in the order as following:

1. The switch that is currently stack master if no other switches are in the same stack.
2. The administrator can select a switch to be the stack master by specifying highest user priority.
3. The switch with the longest uptime will be selected.
4. The switch with the lowest MAC address will be selected.
5. The operational standby switch will become stack master if the current stack master is failed.

i

- The re-election process will be performed if one of these events occurs:
  a) The switch stack is reset.
  b) The switch stack membership is increased by the additional powered-on standalone switch in the system or switch stacks.
- When users change the priority of a switch, the new priority will be applied to the master election process after the switch is rebooted or the re-election occurs.
- If a switch's priority is disabled, it will have never been selected as a stack master.
- A switch configured as a non-master member of a stack won't be competing for the master role when it boots up unless there is no stack master exists in the stack system.
- If more than one stack master exist in a stack, the one with higher priority (or with longest uptime, or with lowest MAC address) will become the stack master. (This is not a normal case. The normal procedures for adding a unit to stack is to connect the stacking cable first or within 20 seconds after power on then boot it up.) If two stack masters exist in a stack, the re-election process will be executed to elect only one stack master in a stack. After the re-election process, the new stack master might not be the previous one. In the result, all the switches attached to losing stack master will reset and rejoin the stack and the whole members of the stack will be re-configured by the new stack master. (That means that the original configurations might be lost.) In the meanwhile, the traffic of the stack will be interrupted.
- Connecting a switch with higher priority or lowest MAC address than current stack master to a stack and then boot it up, this switch is always the stack member. We recommend assigning the highest priority value to the switch that you prefer to be the stack master. This ensures that the switch is re-elected as stack master of the stack if a re-election occurs.
- A switch with different firmware version than the one of stack master will not be allowed to join to the stack system.

6.4 Firmware Upgrade/Distribution Processes

SB11 provides two kinds of methods for firmware upgrade, one is using XMODEM, and the other is using TFTP/FTP. The firmware upgrade is only possible to be performed on the stack master.

Upgrade Processes

After the firmware upgrade operations are finished on stack master, the stack master will distribute the downloaded code automatically to all stack members to keep all members in the stack are running with the same firmware version. In order to run the upgraded code, users are requested/strong recommended to reboot all members in the stack including the stack master.

Distribution Process

Firmware distribution is also only allowed from the stack master by manual operations. Stack master could distribute its current running code through the stacking links to the whole stack's members or specific member in the stack. Stack master could use this function to synchronize the firmware version of stack's members. For example, an IBP with different firmware version is connected to the stack. Actually, this IBP is not joined to the stack due to the firmware version mismatch. The only way to let this IBP to join the stack is to perform the firmware distribution from the stack master. After the firmware is distributed to the IBP, the upgraded IBP is needed to reload with the updated firmware by user.

Auto-upgrade Processes

Firmware auto-upgrade function is supported for the stack members if user enables the auto-upgrade function. As an IBP with different firmware version is added to the stack, the stack master will download its current running firmware from flash ROM to this IBP. The auto-upgrade processes will wait for a few seconds/minutes before starting. When the auto-upgrade processes is completed, the IBP will be asked to reload and re-join to the stack with fully functions. There is an exception for the auto-upgrade function. If the new IBP with higher firmware version is added to the stack, the stack master will not perform the firmware upgrade for this IBP automatically even if the auto-upgrade function is enabled. Instead, stack master will display a message to user indicating the minimum required firmware revision. Subsequently user can choose to upgrade the new firmware for stack master and whole stack members manually with this new firmware version via the provided CLI command sets.

In the stacking system design, the whole stacking system can not be changed or influenced by new added IBP(s). In case of the newer firmware version IBP is added to the stack, the stacking system will not have any upgrade processes.

6.5 Powering Considerations

Stack members that are powered on within the same 20-second time frame participate in the stack master election and have a chance to become the stack master. If the stack members that are powered on after the 20-second time frame do not participate in this initial election and a re-election process will be issued, all of the stack members must participate in the re-election process.

The new stack master becomes available after a few seconds. In the meantime, the IBP stack uses the forwarding tables in memory to minimize network disruption.

Consider the following guidelines before you turn on the IBP(s) in a stack. The purpose of the guidelines is to prevent the stack master is changed as you add new IBP(s) into the stack system. If the stack master is changed, the traffic might be interrupted and the configuration might be lost. (See Master Election Process section) For the first time installation, we recommend you to set the highest priority for an IBP if this IBP will be the stack master in your stack system.

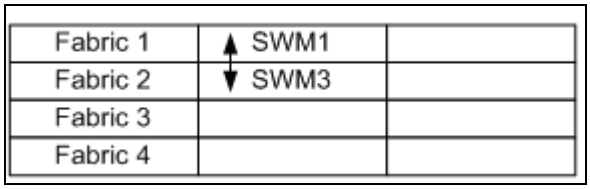
1. The sequence in which you initially turn on the switch might affect the switch that becomes the master of the stack.
2. If you want a particular switch to become the stack master turn on that switch first. This switch becomes the stack master and remains the stack master until a master re-election is required. After about 20 seconds, power on the remaining switches in the stack.
3. Switch that you add to an existing stack has to be connected to the stack via stacking cable within next 20 seconds after it is powered on.
4. Adding powered-on switches (merging) causes the stack masters of the merging switch stacks to re-elect a new stack master from among themselves. All remaining switches will be reconfigured by the new stack master. If the stack master is not the original one, the traffic will be interrupted during the reconfiguration.
5. Removing the stack master will cause the standby switch to take over the master role. All remaining switches will be reconfigured by the new stack master. The traffic will be interrupted during the reconfiguration.
6. Removing stack members from a non-ring topology will cause the switch stack to be divided (partition) into two or more switch stacks; each of them will have the same configuration. This can cause an IP address configuration conflict in your network. If you want the switch stacks to remain to separate, change the IP address or addresses of the newly created switch stacks. If you did not intend to partition the switch stack:
   a) Power off the switches in the newly created switch stacks.
   b) Reconnect them to the original switch stack through their stacking ports.
   c) Power them on again.

Scenario 1: Stack two IBP(s) using the internal stacking link in the same fabric

For instance, CB1 and CB2 are to be stacked. If you want the CB1 be the stack master, you need to plug-in the CB1 first, after 20 more seconds, you plug-in the CB2.

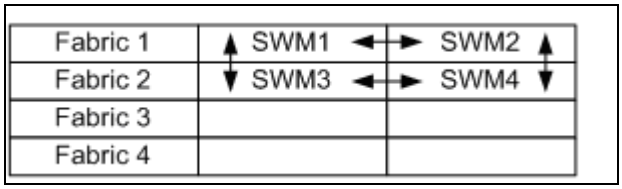
Scenario 2: Stack two IBP(s) using the external stacking link in the different fabric

For instance, CB1 and CB3 are to be stacked. If you want the CB1 to be the stack master, you need to plug-in the CB1 first, after 20 more seconds, plug-in CB3 and connect the external stacking cable between CB1 and CB3 within next 20 seconds.



Scenario 3: Stack four IBP(s) using both internal and external stacking link

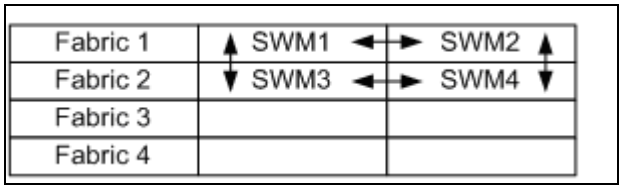
For instance, CB1, CB2, CB3, and CB4 are to be stacked. First, you need to plug-in the SWM that you prefer to be the stack master (CB1) to the fabric, and then plug-in CB2 20 seconds later (refer to scenario 1). Then, you plug-in CB3 and connect the external stacking cable between CB1 and CB3 within the next 20 seconds. Plug-in CB4 and finally connect the external stacking cable between CB2 and CB4.



For the first time installation, the powering consideration has to be followed, otherwise it is not determined which CB will be the master (see master election process). If you have been saved the configurations, you could power them on together. However, the external stacking cables have to be present all the time during powering on.

Scenario 4: Replace a defect stack member from the stack

For instance, CB1, CB2, CB3, and CB4 form a stack system, and CB1 is the stack master and the others are the stack members, and the CB4 is the defect one. You could remove CB4 directly without affecting the functionality of the stack system. Then, plug-in the new CB to the previous position of CB4, and connect the external stacking cable between CB2 and CB4. After CB4 is booted, it will become stack member.

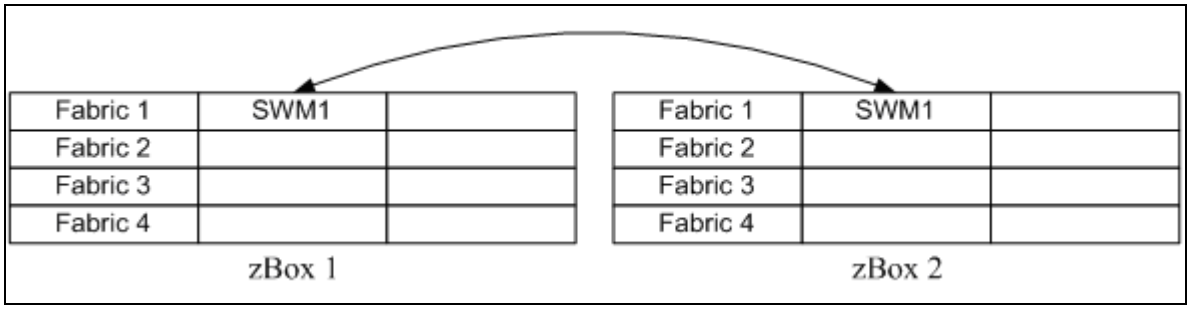


Scenario 5: Replace a defect stack master from the stack (If the defect one is the stack master, this means that the remaining stack members will re-elect a new stack master.)

Assume that the CB1, the stack master, is the defect one, and CB2 becomes the stack master after CB1 is failed. Remove the external stacking cable of CB1, and remove CB1 from the fabric, and plug-in a new CB into the previous position of CB1, then connect the external stacking cable between CB1 and CB3. After CB1 is booted, it will become the stack member. If you want the CB1 to be the stack master, you need to use “switch movemangement <fromunit> <tounit>” command from CB2 (stack master) to move the stack master from CB2 to CB1.

Scenario 6: Stack two IBP(s) across two chassis

Assume that CB1 on zBox 1 to be the stack master, therefore, we need to plug in the CB1 on zBox 1 first. Then, plug-in the CB1 on zBox 2 and connect the stacking cable within the next 20 seconds.



6.6 Provisioning Stack Members

This function provides users to do the offline configuration for an IBP before it joins to the stack. The switch ID is automatically assigned from lowest unused number in the range of 1 to 8. Usually, the stack master will have the lowest switch ID unless you configure the stack with move management command or the re-election process was executed.

User could create stack members from the stack master with a unique member number (switch ID) and configure the functionality in advance for this preconfigured IBP that is not currently part of the stack. If you add an IBP with the identical model into the stack, and the new IBP is using the same member number (switch ID), then the new IBP will be applied with the pre-configured/provisioned configuration by the stack master.

User Assigned Name (UAN) in Provisioning State

The UAN is a unique id for a connection blade and, as a great advantage, is slot related. Therefore the UAN should be used for addressing the interfaces even if a stack member is in provisioning state. This would allow to restore the configuration of a stack member even if the member is replaced by a connection blade with a different switch id. The stack maintenance would become much easier.

1. The stack master should save the UAN along with the switch id of stack members if a member is removed from the stack (either because of unplugging or rebooting or malfunction). This means that a provisioned member can also have a provisioned name. These names have to be hold in nonvolatile memory since they must survive a reboot.
2. For the command ‘switch <id> provision’ optionally a UAN string can be specified after the ‘provision’ parameter. If specified this string should be used as provisioned name of the member. If the specified UAN string is already assigned to another provision entry or already used as UAN name by a present member it should be rejected.
3. If a provisioned member has a provisioned name (UAN) it should be used in the interface specifications of the configuration instead of the switch id. This means that the UAN is continued to be used for interface addressing in the running config if a member has been removed from the stack.
   Further interface specifications using the provisioned name of a provisioned member should be accepted by configuration commands operating on interfaces. If the switch id is used for addressing interfaces it should be replaced by the provisioned name.
   As a result there should be no interface specifications in the running config which is based on the switch id of a provisioned member with a provisioned name.
4. The provisioned name should be displayed in the ‘Name’ column of ‘show switch’ and ‘show unit-identifier-alias’ commands.
5. If a new stack member is detected by the master he should check if the UAN of the new member equals to the provisioned name of one of his provisioned entries.
   – If found the provision entry should be used for the new member. This means that the switch id of the new member should be changed to the switch id of the provision entry. Since solely

the provisioned name has been used in the configuration there should be no occurrences of the previous switch id in the running config.

- If not found but there is a provisioned entry for the switch id of the new member it depends on the provisioned name of this entry. If there is no provisioned name defined the master should use this provisioned entry for the new member. If there is a provisioned name (which inevitably doesn't correspond to the UAN of the new member) another switch id should be elected (see below).
- If not found and there is no provisioned entry for the switch id the stack master should act as before. A new entry in the stack member list is created. For brand-new connection blades which require a switch id election see below.

6. A new switch id has to be elected for new stack members in the following situations:
   - The switch id of the new member is occupied by another active member (behavior as before).
   - The switch id of the new member is used by a provisioned entry for which a provisioned name is defined and the provisioned name is not equal to the UAN of the new member.
   - If the new member is a brand-new connection blade (behavior as before).

   The switch id election should associate the lowest id which is either unused or used in a provisioned entry with NO provision name.

   If all switch ids are occupied by either active members or provisioned entries with provisioned names the lowest switch id of these provisioned entries should be associated. The provisioned name of the selected entry should be replaced by the UAN of the new member and the corresponding interface configuration (which is based on the provisioned name of this entry) should also be transformed to the UAN of the new member.
7. The customer has to take care for unique UANs. Problems resulting from duplicate UANs cannot be intercepted.

6.7 Naming Scheme

The naming scheme for the stack member is described in this section. It will provide an easy way for user to identify and manipulate the specific IBP module, and port of an IBP module.

The MMB has to provide the following information via ISMIC to be read by IBP:

1. **Rack Name** (read only): reserved for future use, will be empty.
2. **Enclosure Name** (read only): MMB will retrieve the Serial No. from the FRU data of the enclosure and make it as the Enclosure Name. (This name MUST be unique.)
3. **Bay Number** (1-8) (read only): Static bay number is assigned by MMB via ISMIC.
4. **SWM User Assigned Name** (read/write): This field is just used as the hostname for the IBP and might be used as DNS name so that this name can be used to access the IBP from Web UI.

6.7.1 IBP Name

The name of IBP is using Connection Blade Module's User-Assigned Name as its name. This default name may be changed by either MMB or IBP through the available interfaces (CLI/Web UI) and is written to the ISMIC memory. During the Ethernet Connection Blade Module booting stage, it always reads and uses this name as the hostname and will be used as DNS name. (Notes: DNS name is only valid if the DNS client is support.)

If there is no name was specified by MMB, it will use the stored name from the configuration file as its hostname.

6.7.2 Naming/Addressing within a Stack

MMB has to prepare the necessary naming information as the Ethernet Connection Blade Module is plugged into the chassis. After Ethernet Connection Blade Module is powered on by Management Blade (MMB), it will read those information via ISMIC.

The MMB will use <Rack Name>-<Enclosure Name>-CB<Bay Number> (or <Enclosure Name>-CB<Bay Number> if <Rack Name> is not defined) as the identifier for the Ethernet Connection Blade Module and put this identifier on the field of SWM User Assigned Name of ISMIC to Ethernet Connection Blade Module. Ethernet Connection Blade Module will use this name "<Rack Name>-<Enclosure Name>-CB<Bay Number>/<Slot ID>/<Port>" to manipulate the ports of that Ethernet Connection Blade Module. <Slot ID>/<Port> is used to identify physical ports or logical ports (port-channel). For example, the first port-channel on enclosure 1 and bay 1 will be represented as "Rack1-Encl1-CB1/1/1".

6.8 Persistent MAC Address

The switch stack MAC address is determined by the MAC address of the stack master. When a stack master is removed from the stack and a new stack master takes over, the default is for the MAC address of the previous stack master will be still the MAC address of the new stack. That is, the stack MAC address never changes to the new stack master MAC address. However, you could disable the persistent MAC address feature to allow a time delay to change the stack MAC address to that of the new stack master. During this time period, if the previous stack master rejoins the stack, the stack continues to use that MAC address as the stack MAC address, even if the switch is now a stack member.

The time period should be the range from 0 to 60 minutes. If you enter the command without value, the default delay is 0 and the stack MAC address will never changes to the new one. If you enter the command with a value of 1 to 60 minutes, the stack MAC address of the previous stack master is used until the configured time expires or until you enter **no stack-mac persistent timer** command. If the previous stack master does not rejoin the stack during this time period, the stack uses the MAC address of the new stack master as the stack MAC address.

If the entire stack reloads, it comes up with the MAC address of the current stack master as the stack MAC address.

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7 E-Keying Function Feature

This chapter provides information of E-Keying function including the overall mechanism and the requirements for Ethernet Connection Blade Modules.

The MMB is the central management entity having the overview of the entire blade chassis configuration. Therefore the MMB is running the central e-keying application which is controlling the e-keying enable/disable functions of the Ethernet Connection Blade Modules, mezzanines and CPU Blades. On one hand the MMB will talk to the BMC on the Server Blades via IPMI to disable/enable ports on the CPU Blades and mezzanine cards. On the other hand the MMB informs the Ethernet Connection Blade Modules via ISMIC to enable/disable the downlink ports of the Ethernet Connection Blade Module. Only compatible server blade and mezzanine connections to Ethernet Connection Blade Module will be enabled by the MMB e-keying process during power-on process of the modules. After this initialization procedure the e-keying process will permanently update the enabled ports according to any server blade/mezzanine or Connection Blade Module installation changes.

E-Keying is a mechanism:

1. To disable any unused downlink ports in Ethernet Connection Blade Modules.
2. To disable any downlink ports of Ethernet Connection Blade Modules which are connected to an incompatible mezzanine card or CPU blade port.
3. To disable any mezzanine cards or CPU blade channel which are connected to an incompatible downlink port of Ethenet Connection Blade Module.
4. To avoid any hardware problems and false error messages due to incompatible signal levels.

Ethernet Connection Blade Module Behaviors:

1. The e-keying feature will be realized in such a way that all the available configuration functions in the Ethernet Connection Blade Modules remain available and operational.
2. The e-keying enable/disable function is independent of the already available port enable/disable feature in the Ethernet Connection Blade Modules (shutdown/no shutdown) and mezzanine Cards (enable/disable).
3. The e-keying enable/disable function will be realized as a “low level physical” feature independent and “below” the standard Ethernet Connection Blade Module / mezzanine card port enable/disable feature.
4. All the UI (CLI / Web UI) of Ethernet Connection Blade Module will be extended to display the e-keying status of the downlink ports.

As ports of Ethernet Connection Blade Module are disabled by the e-keying function, they could not be allowed to be enabled in Ethernet Connection Blade Module by user, but user could configure any switching functions for those ports as usual. User could enable or disable those ports if they are enabled again by the e-keying function.

As a port is disabled by the e-keying function, user still could configure any functions on this port. However, this port might be disabled by the firmware internally for some functionality such as link state function. In this case, the port will be in disabled state if this port is enabled again by e-keying function.

8 Web-based Management Interface

8.1 Overview

The BX900 Ethernet Connection Blade provides a built-in browser software interface that lets you configure and manage it remotely using a standard Web browser such as Microsoft Internet Explorer or Firefox. This software interface also allows for system monitoring and management of the Ethernet Connection Blade. When you configure this Ethernet Connection Blade for the first time from the console, you have to assign an IP address and subnet mask to the Ethernet Connection Blade. Thereafter, you can access the Ethernet Connection Blade's Web software interface directly using your Web browser by entering the IBP's IP address into the address bar. In this way, you can use your Web browser to manage the Ethernet Connection Blade from any remote PC station, just as if you were directly connected to it's console port.

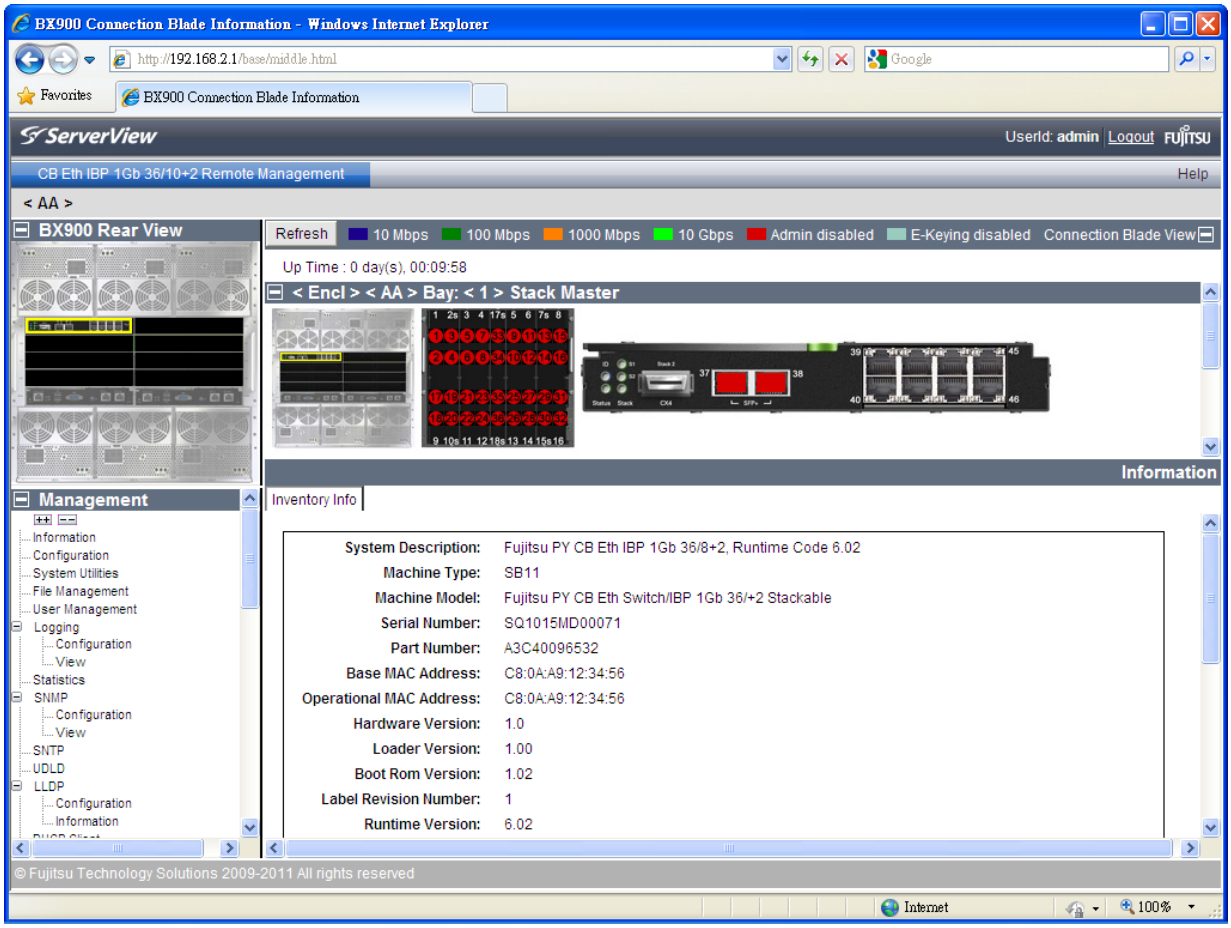

Figure : Web Management Interface

8.1.1 Menu Options

The menu options available are: Management, Group Administration, Security, QoS, and Stacking.

1. **Management Menu:**

   This section provides information for configuring SNMP and trap manager, Ping, DHCP client, SNTP, system time, defining system parameters including telnet session and console baud rate, etc, downloading IBP module software, and resetting the IBP module, IBP statistics and Layer 2 MAC address.

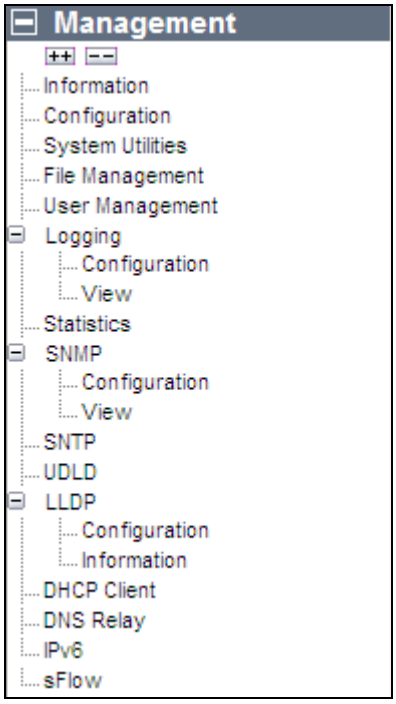

Figure : Management Menu

2. **Group Administration Menu:**

   This section provides users to configure Uplink Set, Port Group, VLAN Port Group, Service LAN, Service VLAN, Auto VLAN, Port, Port Channel and Port Backup.

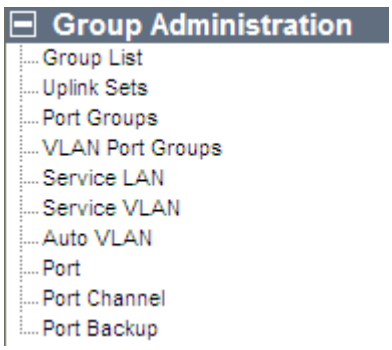

Figure : Group Administration Menu

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3. **Security Menu:**

   This section provides users to configure IBP securities including 802.1x, RADIUS, TACACS+, LDAP, Access Control Lists, IP Filter, Secure HTTP, Secure Shell.

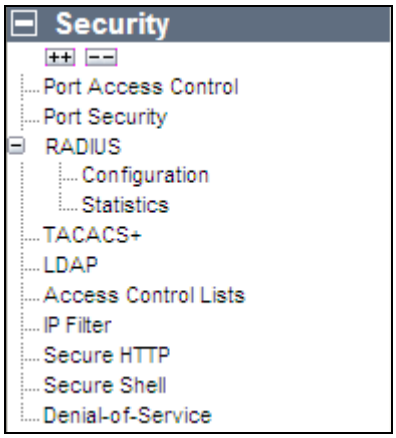

Figure : Security Menu

4. **QoS Menu:**

   This section provides users to configure Differentiated Service, and Class of Service.

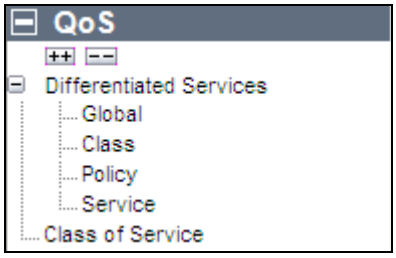

Figure : QoS Menu

5. **Stacking Menu (in Stackable Ethernet Connection Blade):**

   This section provides users to configure stacking units and update runtime code of stacking units.

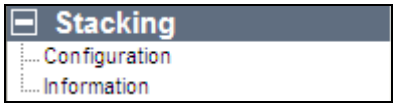

Figure : Stacking Menu

8.2 Management Menu

This section provides information for configuring SNMP and trap manager, Ping, DHCP client, SNTP, system time, defining system parameters including telnet session and console baud rate, etc, downloading IBP module software, and resetting the IBP module, IBP statistics and Layer 2 MAC address.

8.2.1 Information

8.2.1.1 Inventory Info

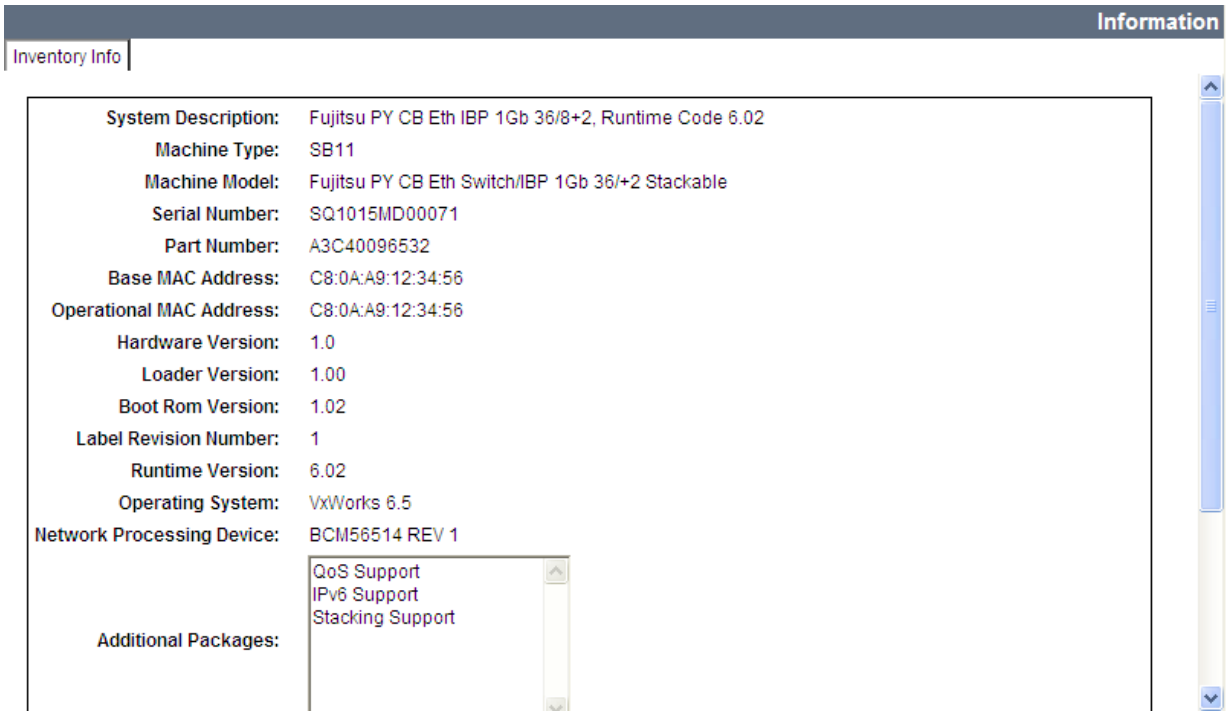

Figure : Inventory Information

Use this panel to display the IBP's Vital Product Data, stored in non-volatile memory at the factory.

Non-Configurable Data

System Description - The product name of this IBP.

Machine Type - The machine type of this IBP.

Machine Model - The model within the machine type.

Serial Number - The unique box serial number for this IBP.

Part Number - The manufacturing part number.

Base MAC Address - The burned-in universally administered MAC address of this IBP.

Operational MAC Address - The operational MAC address of this IBP.

Hardware Version - The hardware version of this IBP. The first byte is the major version and the second byte represents the minor version.

Loader Version - The release version maintenance number of the loader code currently running on the IBP. For example, if the release was 1 and the version was 2, the format would be '1.2'.

Boot Rom Version - The release version maintenance number of the boot rom code currently running on the IBP. For example, if the release was 1 and the version was 2, the format would be '1.2'.

Label Revision Number - The label revision serial number of this IBP is used for manufacturing purpose.

Runtime Version - The release version maintenance number of the code currently running on the IBP. For example, if the release was 1 and the version was 2, the format would be '1.2'.

Operating System - The operating system currently running on the IBP.

Network Processing Device - Identifies the network processor hardware.

Additional Packages - A list of the optional software packages installed on the IBP, if any. For example, QoS, IPv6 or Stacking support.

Module - The SFP module name.

Type - The SFP type

Status - The SFP status.

Ethernet Compliance Codes - Transceiver's compliance codes.

Vendor Name - The SFP transceiver vendor name shall be the full name of the corporation, a commonly accepted abbreviation of the name of the corporation, the SCSI company code for the corporation, or the stock exchange code for the corporation.

Vendor Part Number - Part number provided by SFP transceiver vendor.

Vendor Serial Number - Serial number provided by vendor.

Vendor Revision Number - Revision level for part number provided by vendor.

Vendor Manufacturing Date - Identifies the network processor hardware.

Command Buttons

Refresh - Refresh the page with the latest data

8.2.2 Configuration

8.2.2.1 System Description

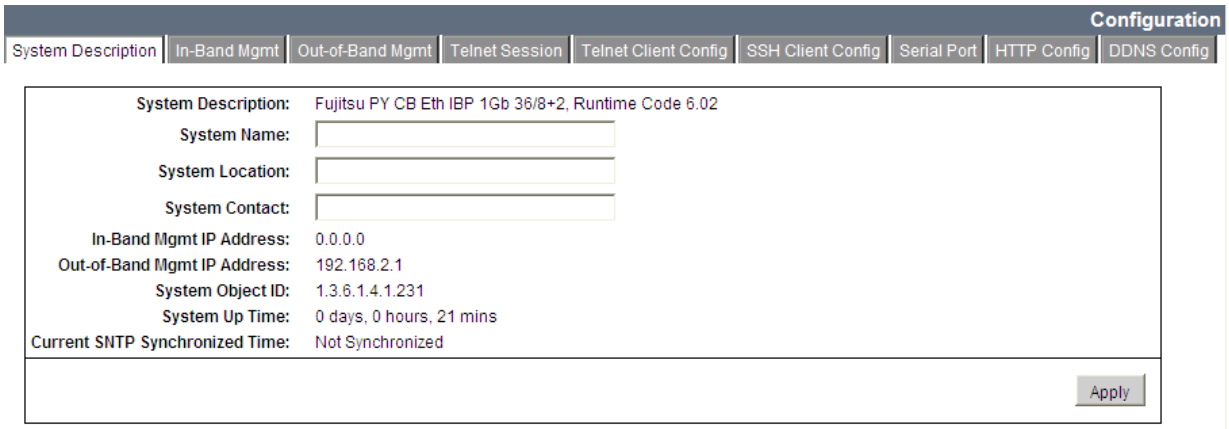

Figure : System Description

Configurable Data

System Name - Enter the name you want to use to identify this IBP. You may use up to 31 alpha-numeric characters. The factory default is blank.

System Location - Enter the location of this IBP. You may use up to 31 alpha-numeric characters. The factory default is blank.

System Contact - Enter the contact person for this IBP. You may use up to 31 alpha-numeric characters. The factory default is blank.

Non-Configurable Data

System Description - The product name of this IBP.

In-Band Mgmt IP Address - The IP address assigned to the In-Band Mgmt (accessed via the external ports).

Out-of-Band Mgmt IP Address - The IP address assigned to the Out-of-Band Mgmt (accessed via MMB service port).

System Object ID - The base object ID for the IBP's enterprise MIB.

System Up time - The time in days, hours and minutes since the last IBP reboot.

Current SNTP Synchronized Time - Displays currently synchronized SNTP time in UTC. If time is not synchronized, it displays "Not Synchronized."

Command Buttons

Apply - Update the IBP with the values on the screen. If you want the IBP to retain the new values across a power cycle you must perform a save.

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8.2.2.2 In-Band Mgmt

The In-Band Mgmt is the logical interface used for in-band connectivity with the IBP via any of the IBP's front panel ports. The configuration parameters associated with the IBP's In-Band Mgmt do not affect the configuration of the front panel ports through which traffic is switched or routed

To access the IBP over a network you must first configure it with IP information (IP address, subnet mask, and default gateway). You can configure the IP information using any of the following:

- BOOTP
- DHCP
- Terminal interface via the EIA-232 port (with console redirection from MMB)

Once you have established in-band connectivity, you can change the IP information using any of the following:

- Terminal interface via the EIA-232 port
- Terminal interface via telnet
- SNMP-based management
- Web-based management

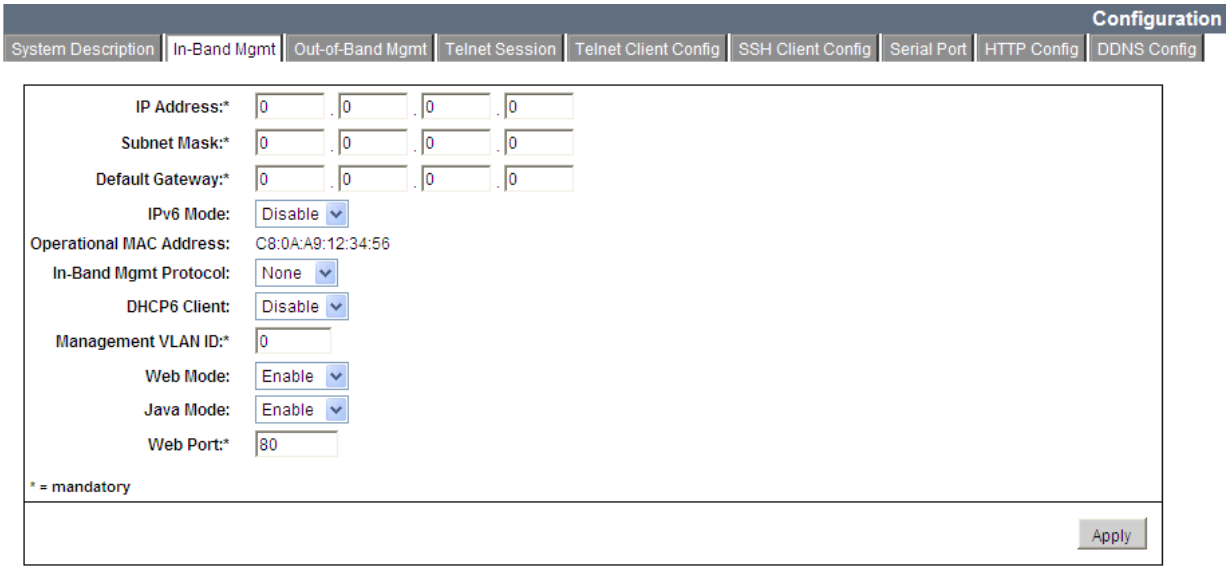

Figure : In-Band Mgmt Config

Selection Criteria

IPv6 Mode - Enable/Disable IPv6 stack for in-band mgmt interface.

In-Band Mgmt Protocol - Specify what the IBP should do following power-up: transmit a Bootp request, transmit a DHCP request, or do nothing (None). The factory default is None.
You cannot make this choice for both the In-Band Mgmt Protocol and the Out-of-Band Mgmt . You will only be given the choices for “None” here if the OOB Interface Configured Protocol is configured to “Bootp” or “DHCP”.

DHCP6 Client - Selects if the DHCP6 Client is enabled or disabled. You cannot make this choice for both the In-Band Mgmt and the Out-of-Band Mgmt. You will only be given the choices for Enable here if the Out-of-Band Mgmt is configured to Disable.

Web Mode - Specify whether the IBP may be accessed from a web browser. If you choose to enable web mode you will be able to manage the IBP from a web browser. The factory default is enabled.

Java Mode - Enable or disable the java applet that displays a picture of the IBP at the top right of the screen. If you run the applet you will be able to click on the picture of the IBP to select configuration screens instead of using the navigation tree at the left side of the screen. The factory default is enabled.

Configurable Data

IP Address - The IP address of the interface. The factory default value is 0.0.0.0.

Subnet Mask - The IP subnet mask for the interface. The factory default value is 0.0.0.0.

Default Gateway - The default gateway for the IP interface. The factory default value is 0.0.0.0. You cannot set default gateway for both the In-Band Mgmt and the Out-of-Band Mgmt at the same time. You can modify the gateway here if the gateway of Out-of-Band Mgmt is configured to 0.0.0.0.

Management VLAN ID - Specifies the management VLAN ID of the IBP. It may be configured to any value in the range of 0 - 4093. The management VLAN is used for management of the IBP. This field is configurable for administrative users and read-only for other users.

Web Port - This select field is used to set the HTTP Port Number. The value must be in the range of 1 to 65535. Port 80 is the default value. The currently configured value is shown when the web page is displayed.

Non-Configurable Data

Burned-in MAC Address - The burned-in MAC address used for in-band connectivity if you choose not to configure a locally administered address. (Only used in non-stackable module)

Operational MAC Address - The operational MAC address of this IBP. (Only used in stackable module)

IPv6 Address - Display IPv6 address.

IPv6 Default Router - Display IPv6 Default Router Address.

Command Buttons

Apply - Update the IBP with the values on the screen. If you want the IBP to retain the new values across a power cycle you must perform a save.

8.2.2.3 Out-of-Band Mgmt

Out-of-Band Mgmt interface provides a network access connection via MMB's service port.

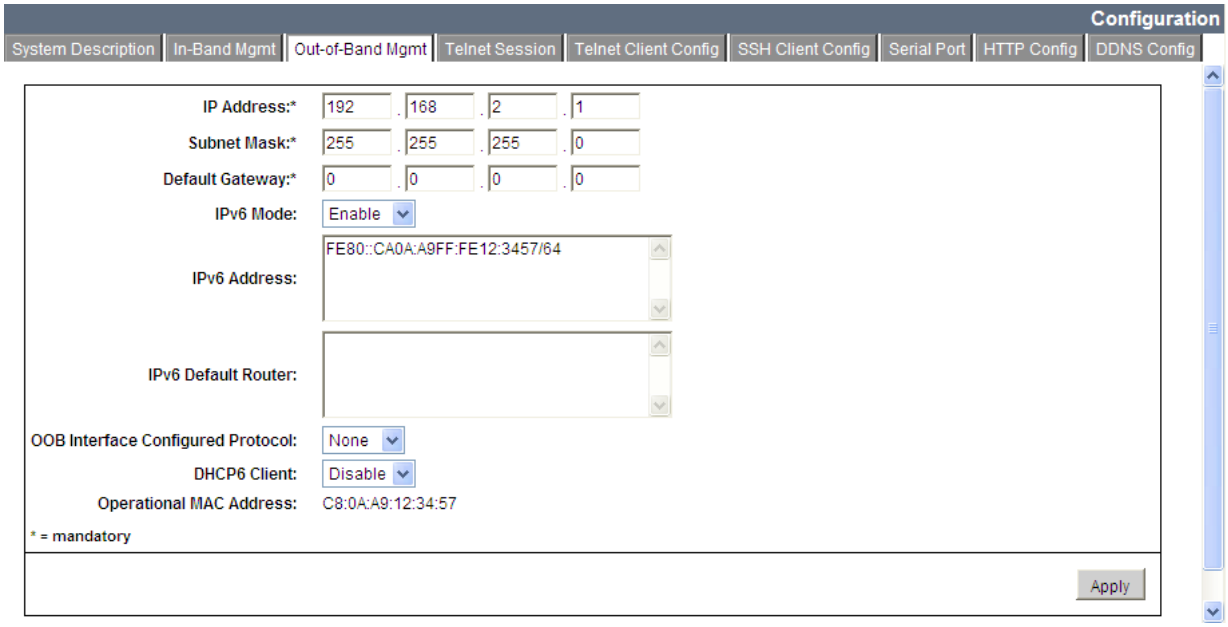

Figure : Out-of-Band Mgmt Config

You use this panel to specify the parameters needed to communicate with the IBP over a network using the Out-of-Band Mgmt.

Selection Criteria

IPv6 Mode - Enable/Disable IPv6 stack for out-of-band mgmt interface.

OOB Interface Configured Protocol - Choose what the IBP should do following power-up: transmit a Bootp request, transmit a DHCP request, or do nothing (none). The factory default is DHCP. You cannot make this choice for both the In-Band Mgmt and the Out-of-Band Mgmt. You will only be given the choices for "None" here if the In-Band Mgmt is configured to "Bootp" or "DHCP".

DHCP6 Client - Selects if the DHCP6 Client is enabled or disabled. You cannot make this choice for both the In-Band Mgmt and the Out-of-Band Mgmt. You will only be given the choices for Enable here if the In-Band Mgmt is configured to Disable.

Configurable Data

IP Address - The IP address of the interface. The factory default value is 0.0.0.0.

Subnet Mask - The IP subnet mask for the interface. The factory default value is 0.0.0.0.

Default Gateway - The default gateway for the IP interface. The factory default value is 0.0.0.0.

You cannot set default gateway for both the In-Band Mgmt and the Out-of-Band Mgmt. You can modify the gateway here if the gateway of In-Band Mgmt is configured to 0.0.0.0.

Non-Configurable Data

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Burned-in MAC Address - The burned-in MAC address used for out-of-band connectivity. (Only used in non-stackable module)

Operational MAC Address - The operational MAC address of this IBP. (Only used in stackable module)

IPv6 Address - Display IPv6 address.

IPv6 Default Router - Display IPv6 Default Router Address.

Command Buttons

Apply - Update the IBP with the values on the screen. If you want the IBP to retain the new values across a power cycle you must perform a save.

8.2.2.4 Telnet Session

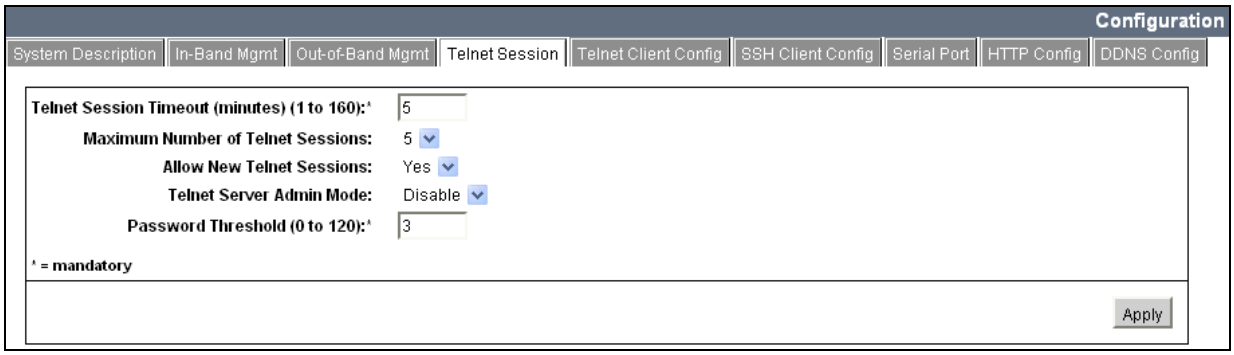

Figure : Telnet Session Config

Selection Criteria

Maximum Number of Telnet Sessions - Use the pull down menu to select how many simultaneous telnet sessions will be allowed. The maximum is 5, which is also the factory default.

Allow New Telnet Sessions - If you set this to no, new telnet sessions will not be allowed. The factory default is yes.

Telnet Server Admin Mode - Administrative mode for inbound telnet sessions. Setting this value to disable shuts down the telnet port. If the admin mode is set to disable, then all existing telnet connections are disconnected. The default value is Enable.

Configurable Data

Telnet Session Timeout (minutes) - Specify how many minutes of inactivity should occur on a telnet session before the session is logged off. You may enter any number from 1 to 160. The factory default is 5.

Password Threshold - When the logon attempt threshold is reached on the console port, the system interface becomes silent for a specified amount of time before allowing the next logon attempt. (Use the silent time command to set this interval.) When this threshold is reached for Telnet, the Telnet logon interface closes.

Command Buttons

Apply - Update the IBP with the values on the screen. If you want the IBP to retain the new values across a power cycle you must perform a save.

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8.2.2.5 Telnet Client Config

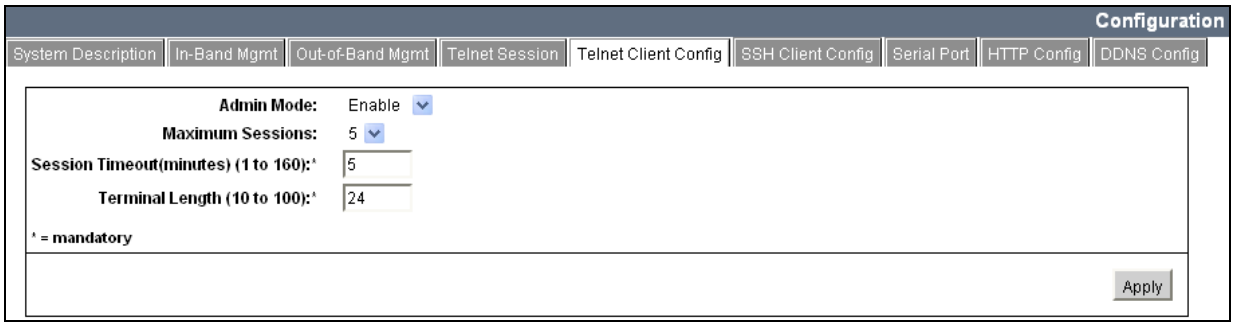

Figure : Telnet Client Config

Selection Criteria

Admin Mode - Specifies if the Outbound Telnet service is Enabled or Disabled. Default value is Enabled.

Maximum Sessions - Specifies the maximum number of Outbound Telnet Sessions allowed. Default value is 5. Valid Range is (0 to 5).

Configurable Data

Session Timeout - Specifies the Outbound Telnet login inactivity timeout. Default value is 5. Valid Range is (1 to 160).

Terminal Length - Specify the max scroll line of console

Command Buttons

Apply - Sends the updated configuration to the IBP. Configuration changes take effect immediately.

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8.2.2.6 SSH Client Config

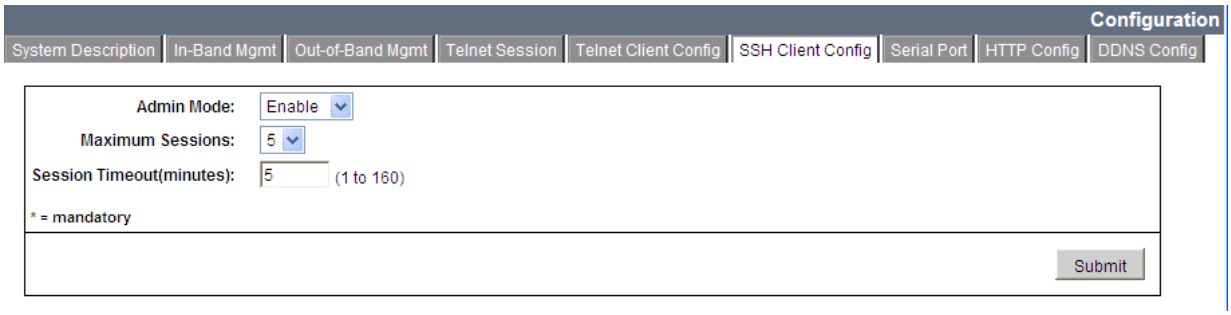

Figure : SSH Client Config

Selection Criteria

Admin Mode - Specifies if the Outbound SSH service is Enabled or Disabled. Default value is Enabled.

Maximum Sessions - Specifies the maximum number of Outbound SSH Sessions allowed. Default value is 5. Valid Range is (0 to 5).

Configurable Data

Session Timeout - Specifies the Outbound SSH login inactivity timeout. Default value is 5. Valid Range is (1 to 160).

Command Buttons

Submit - Sends the updated configuration to the switch. Configuration changes take effect immediately.

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8.2.2.7 Serial Port

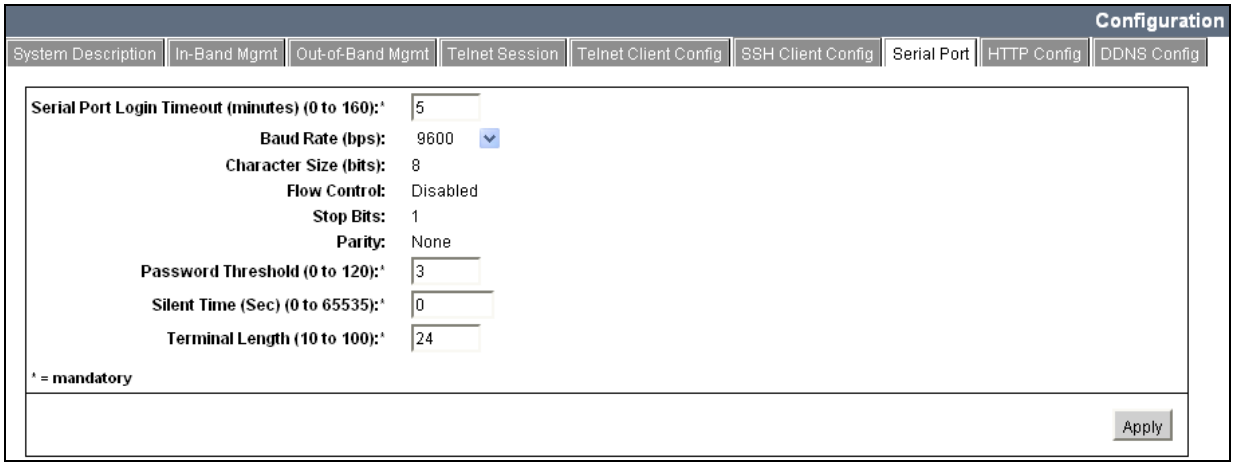

Figure : Serial Port Config

Selection Criteria

Baud Rate (bps) - Select the default baud rate for the serial port connection from the pull-down menu. You may choose from 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200 baud. The factory default is 9600 baud.

If you change the baud rate, the console redirection via MMB doesn't work anymore.

Configurable Data

Serial Port Login Timeout (minutes) - Specify how many minutes of inactivity should occur on a serial port connection before the IBP closes the connection. Enter a number between 0 and 160: the factory default is 5. ***Entering 0 disables the timeout.***

Password Threshold - When the logon attempt threshold is reached on the console port, the system interface becomes silent for a specified amount of time before allowing the next logon attempt. (Use the silent time command to set this interval.) When this threshold is reached for Telnet, the Telnet logon interface closes.

Silent Time (Sec) - Use this command to set the amount of time the management console is inaccessible after the number of unsuccessful logon attempts exceeds the threshold set by the password threshold command.

Terminal Length - Specify the max scroll line of console

Non-Configurable Data

Character Size (bits) - The number of bits in a character. This is always 8.

Flow Control - Whether hardware flow control is enabled or disabled. It is always disabled.

Stop Bits - The number of stop bits per character. Its is always 1.

Parity - The parity method used on the serial port. It is always None.

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Command Buttons

Apply - Update the IBP with the values on the screen. If you want the IBP to retain the new values across a power cycle you must perform a save.

8.2.2.8 HTTP Config

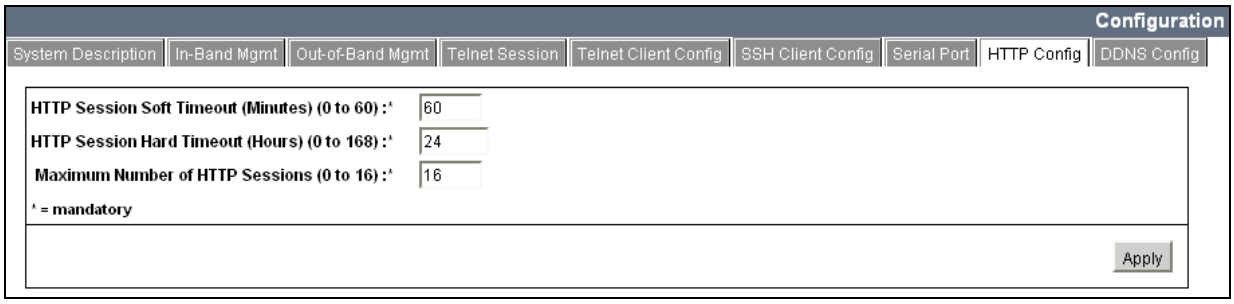

Figure : HTTP Config

Configurable Data

HTTP Session Soft Timeout - This field is used to set the inactivity timeout for HTTP sessions. The value must be in the range of (0 to 60) minutes. A value of zero corresponds to an infinite timeout. The default value is 15 minutes. The currently configured value is shown when the web page is displayed.

HTTP Session Hard Timeout - This field is used to set the hard timeout for HTTP sessions. This timeout is unaffected by the activity level of the session. The value must be in the range of (0 to 168) hours. A value of zero corresponds to an infinite timeout. The default value is 24 hours. The currently configured value is shown when the web page is displayed.

Maximum Number of HTTP Sessions - This field is used to set the maximum allowable number of HTTP sessions. The value must be in the range of (0 to 16). The default value is 16. The currently configured value is shown when the web page is displayed.

Command Buttons

Apply - Send the updated screen to the IBP. Changes take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

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8.2.2.9 DDNS Config

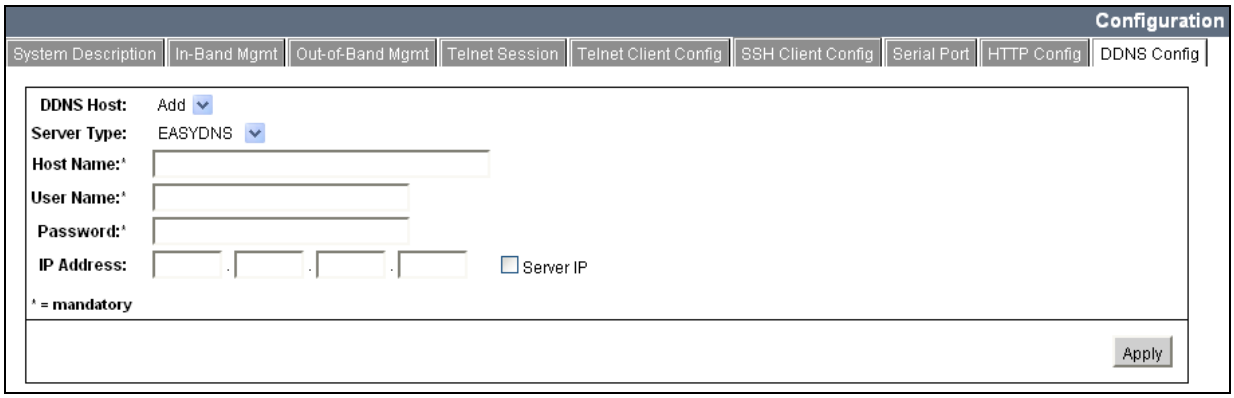

Figure : DDNS Config

Selection Criteria

DDNS Host - Selects the DDNS Host for which data is to be displayed or configured. If the add item is selected, a new DDNS Host can be configured.

Server Type - Selects the server type of DDNS server. You can choose any of the following type :

- EASYDNS
- DYNDNS
- DHS
- ODS
- DYNS
- ZONEEDIT
- TZO

Configurable Data

Host Name - The host name of DDNS server.

User Name - The user name for DDNS server.

Password - The optional new or changed password for the account. It will not display as it is typed, only asterisks(*) will show. Passwords are up to 32 characters in length, and are case sensitive.

IP Address - The IP address is mapped with the "Host Name" that you set.

Server IP - If this option is selected, the IP Address will be set to In-Band Mgmt IP address.

Command Buttons

Apply - Send the updated screen to the IBP and cause the changes to take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

Remove - Remove the selected DDNS configuration.

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8.2.3 System Utilities

8.2.3.1 Save All Changes

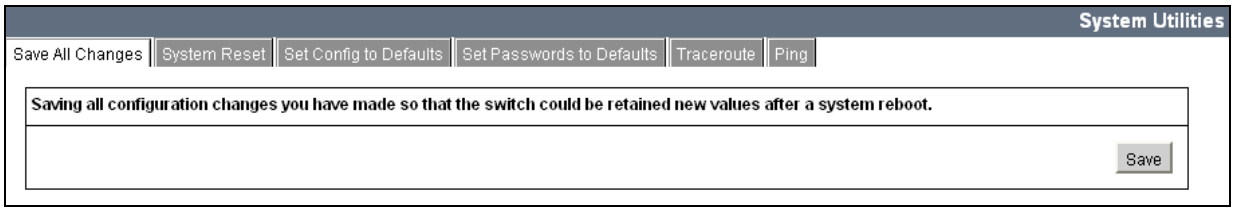
System Utilities
Save All Changes
System Reset
Set Config to Defaults
Set Passwords to Defaults
Traceroute
Ping
Saving all configuration changes you have made so that the switch could be retained new values after a system reboot.
Save

Figure : Save All Changes

Command Buttons

Save - Click this button to have configuration changes you have made saved across a system reboot. All changes submitted since the previous save or system reboot will be retained by the IBP.

8.2.3.2 System Reset

System Utilities
Save All Changes
System Reset
Set Config to Defaults
Set Passwords to Defaults
Traceroute
Ping
Switch ID:
All
Resetting the panel will cause all operations of this panel to stop. This session will be broken and you will have to log in again after the panel has rebooted. Any unsaved changes will be lost.
Reset

Figure : System Reset

Command Buttons

Reset - Select this button to reboot the IBP. Any configuration changes you have made since the last time you issued a save will be lost. You will be shown a confirmation screen after you select the button.

8.2.3.3 Set Config to Defaults

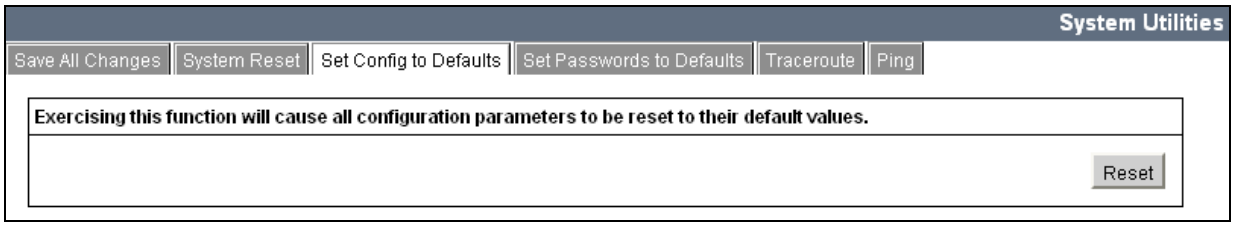

Figure : Set Config to Defaults

Command Buttons

Reset - Select this button to have all configuration parameters reset to their factory default values. All changes you have made will be lost, even if you have issued a save. You will be shown a confirmation screen after you select the button.

8.2.3.4 Set Passwords to Defaults

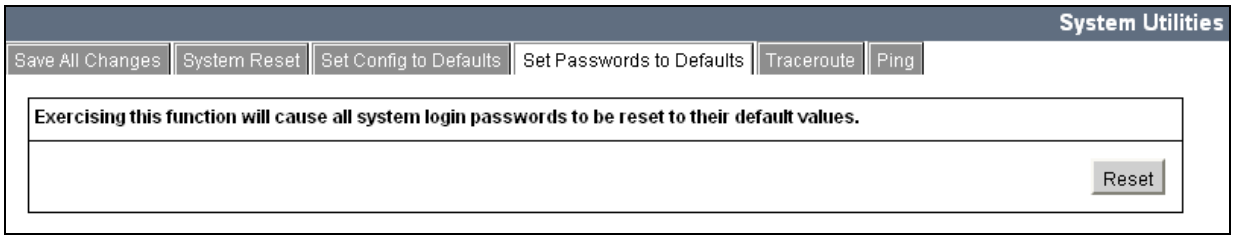

Figure : Set Passwords to Defaults

Command Buttons

Reset - Clicking the Reset button will reset all of the system login passwords to their default values. If you want the IBP to retain the new values across a power cycle, you must perform a save.

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8.2.3.5 Traceroute

Use this screen to tell the IBP to send a TraceRoute request to a specified IP address. You can use this to discover the paths packets take to a remote destination. Once you click the Apply button, the IBP will send traceroute and the results will be displayed below the configurable data. If a reply to the traceroute is you will see

```
1 x.y.z.w       1 ms 2 ms 3 ms

2 0.0.0.0       0 ms 0 ms 0 ms

3 0.0.0.0       0 ms 0 ms 0 ms
```

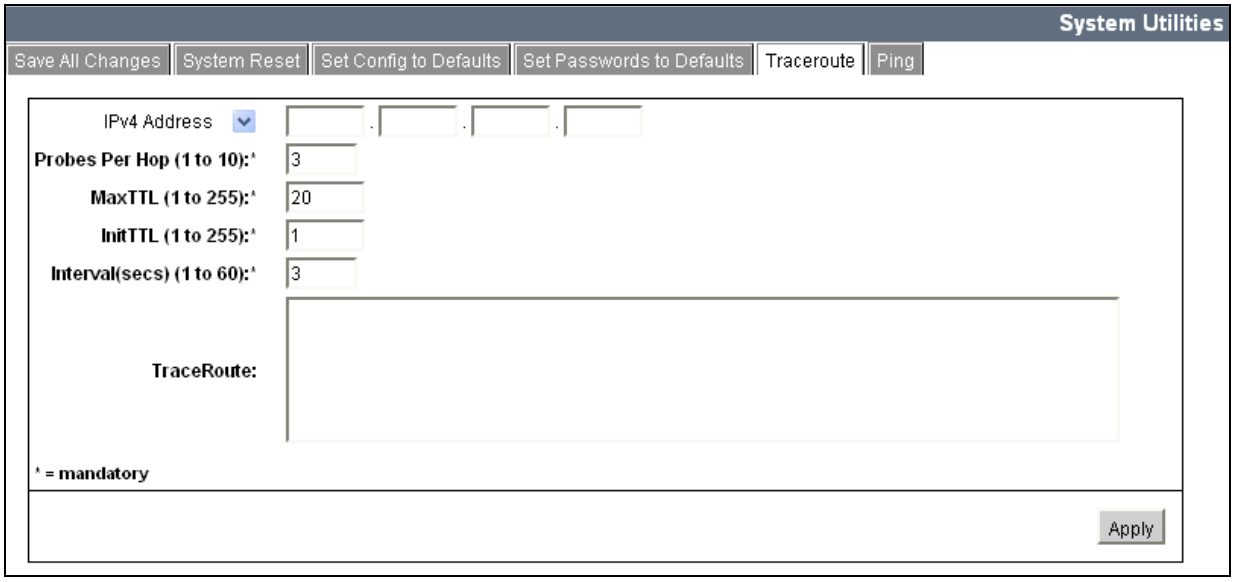

Figure : Traceroute

Configurable Data

IPv4 Address/Host Name/Host Name V6/IPv6 Address - Enter the address of the station you want the IBP to discover path. The initial value is blank. The address you enter is not retained across a power cycle.

Probes Per Hop - Enter the number of probes per hop. The initial value is default. The Probes per Hop you enter is not retained across a power cycle.

MaxTTL - Enter the maximum TTL for the destination. The initial value is default value. The MaxTTL you enter is not retained across a power cycle.

InitTTL - Enter the initial TTL to be used. The initial value is default value. The InitTTL you enter is not retained across a power cycle.

Interval - Enter the Time between probes in seconds. The initial value is default value. The Interval you enter is not retained across a power cycle.

Command Buttons

Apply - This will initiate the traceroute.

8.2.3.6 Ping

Use this screen to tell the IBP to send a Ping request to a specified IP address. You can use this to check whether the IBP can communicate with a particular IP station. Once you click the Apply button, the IBP will send three pings and the results will be displayed below the configurable data. If a reply to the ping is not received, you will see

```
No Reply Received from IP xxx.xxx.xxx.xxx
```

, otherwise you will see

```
Reply received from IP xxx.xxx.xxx.xxx : (send count = 3, receive count = n).
```

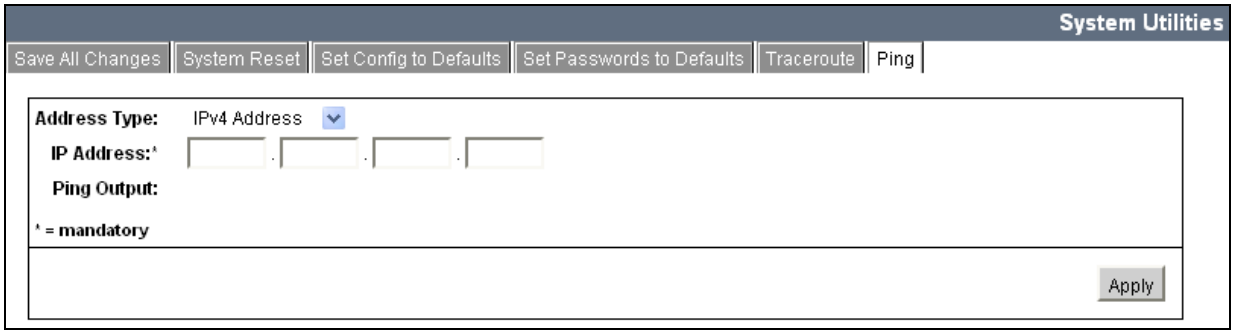

Figure : Ping

Selection Criteria

Address Type - Select the address type for IPv4 address, host name, host name V6 or the IPv6 address.

Configurable Data

The following options are according to the address type you choose :

- IPv4 Address:

  IP Address - Enter the IPv4 address of the station you want the IBP to ping. The initial value is blank. The IPv4 address you enter is not retained across a power cycle.

- Host Name:

  Host Name - Enter the host name of the station you want the IBP to ping.

- Host Name V6:

  Host Name V6 - Enter the host name of the IPv6 station you want the IBP to ping.

- IPv6 Address:

  Ping - Select either global IPv6 address or Link Local Address to ping.

  The following options are according to the ping type you choose:

  - Global:

    IPv6 Address - Enter the IPv6 address of the station you want the IBP to ping.

    Datagram Size - Enter the datagram size. The valid range is 48 to 2048.

  - Link Local:

    Management Type - Select in-band mgmt or out-of-band mgmt.

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Link Local Address - Enter the link local address of the station you want the IBP to ping. The initial value is blank.

Datagram Size - Enter the datagram size. The valid range is 48 to 2048.

None Configurable Data

Ping Output - The reply result received from IBP.

Command Buttons

Apply - This will initiate the ping.

8.2.4 File Management

8.2.4.1 Download To IBP

Use this menu to download a file to the IBP.

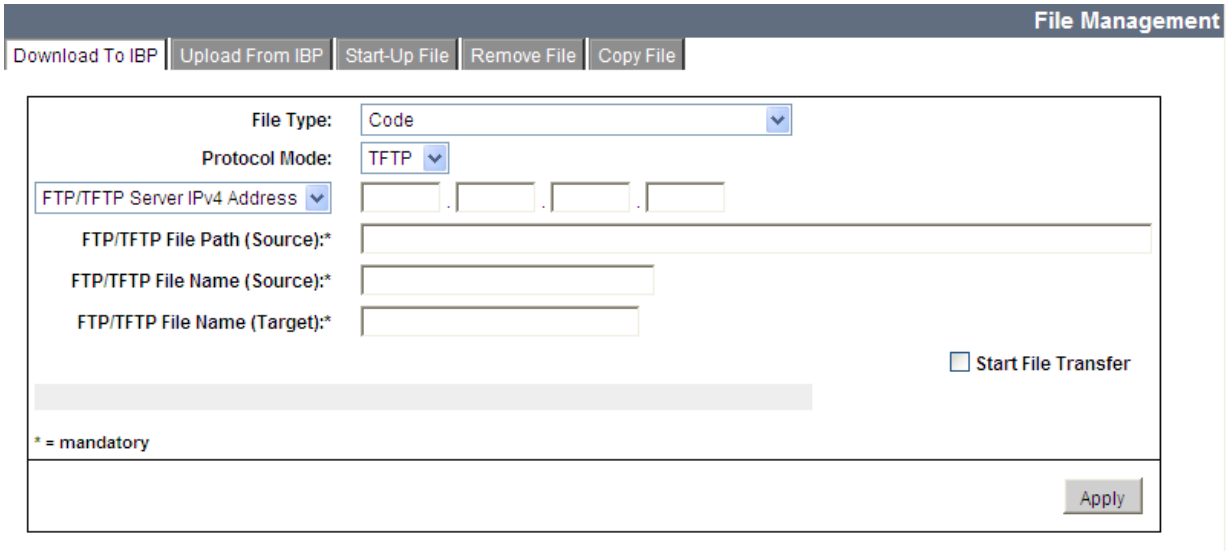

Figure : File Download To IBP

Selection Criteria

File Type - Specify what type of file you want to download: (Default value of file type is code.)

- **Script** - specify configuration script when you want to update the IBP's script file.
- **CLI Banner** - The Banner of CLI interface.
- **Code** - specify code when you want to upgrade the operational flash.
- **Configuration** - specify configuration when you want to update the IBP's configuration. If the file has errors the update will be stopped.
- **SSH-1 RSA Key File** - SSH-1 Rivest-Shamir-Adleman (RSA) Key File
- **SSH-2 RSA Key PEM File** - SSH-2 Rivest-Shamir-Adleman (RSA) Key File (PEM Encoded)
- **SSH-2 DSA Key PEM File** - SSH-2 Digital Signature Algorithm (DSA) Key File (PEM Encoded)
- **SSL Trusted Root Certificate PEM File** - SSL Trusted Root Certificate File (PEM Encoded)
- **SSL Server Certificate PEM File** - SSL Server Certificate File (PEM Encoded)
- **SSL DH Weak Encryption Parameter PEM File** - SSL Diffie-Hellman Weak Encryption Parameter File (PEM Encoded)
- **SSL DH Strong Encryption Parameter PEM File** - SSL Diffie-Hellman Strong Encryption Parameter File (PEM Encoded)

To download SSH key files SSH must be administratively disabled and there can be no active SSH sessions.

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Protocol Mode - Specify the protocol of mode to download. The available options are FTP, TFTP and HTTP.

Configurable Data

FTP/TFTP Server IPv4 Address - Enter the IPv4 address of the FTP/TFTP server. The factory default is 0.0.0.0.

FTP/TFTP Server Host Name - Enter the Host Name of the FTP/TFTP server.

FTP/TFTP Server IPv6 Address - Enter the IPv6 address of the FTP/TFTP server.

FTP User - Enter the user name on the FTP server.

FTP Password - Enter the password of the FTP user.

FTP/TFTP File Path (Source) - Enter the path on the FTP/TFTP server where the selected file is located. You may enter up to 96 characters (including the tailing slash). The factory default is blank.

FTP/TFTP File Name (Source) - Enter the name on the FTP/TFTP server of the file you want to download. You may enter up to 32 characters. The factory default is blank.

FTP/TFTP File Name (Target) - Enter the name on the IBP of the file you want to save. You may enter up to 30 characters. The factory default is blank.

Select File (Source) - Using the file manager to choose the file you want to download to switch.

File Name (Target) - Enter the name on the switch of the file you want to save. You may enter up to 30 characters. The factory default is blank.

Start File Transfer - To initiate the download you need to check this box and then select the Apply button.

Non-Configurable Data

The last row of the table is used to display information about the progress of the file transfer. The screen will refresh automatically until the file transfer completes.

Command Buttons

Apply - Send the updated screen to the IBP and perform the file download.

8.2.4.2 Upload From IBP

Use this menu to upload a code, configuration or log file from the IBP.

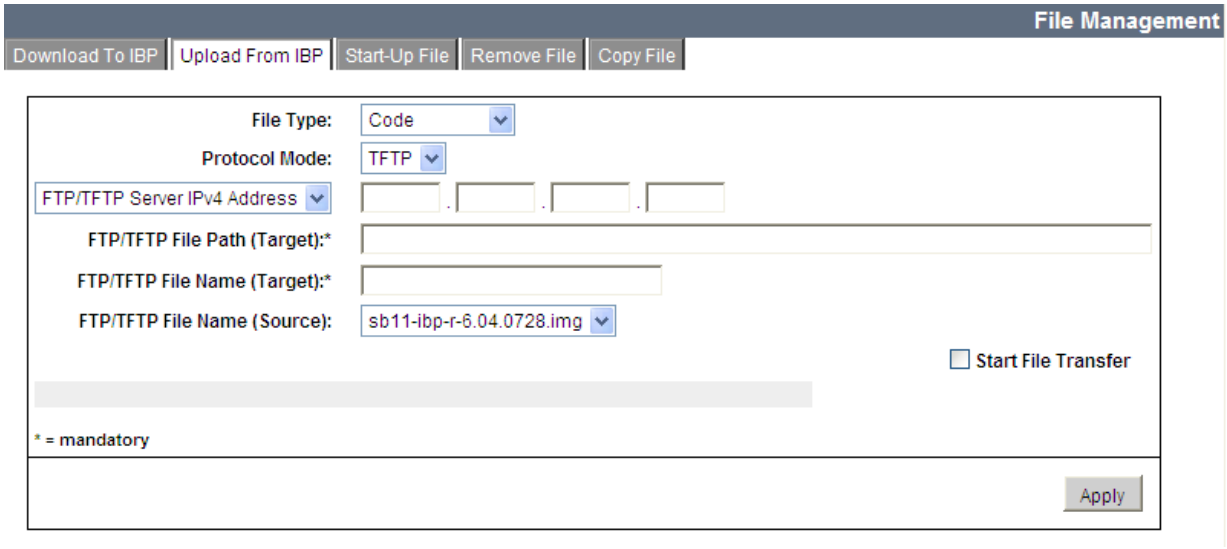

Figure : File Upload From IBP

Selection Criteria

File Type - Specify the type of file you want to upload. The available options are Script, Code, CLI Banner, Configuration, Error Log, Buffered Log, and Trap Log. The factory default is Code.

Protocol Mode - Specify the protocol of mode to upload. The available options are FTP and TFTP.

Configurable Data

FTP/TFTP Server IPv4 Address - Enter the IPv4 address of the FTP/TFTP server. The factory default is 0.0.0.0.

FTP/TFTP Server Host Name - Enter the Host Name of the FTP/TFTP server.

FTP/TFTP Server IPv6 Address - Enter the IPv6 address of the FTP/TFTP server.

FTP/TFTP File Path (Target) - Enter the path on the FTP/TFTP server where you want to put the file being uploaded. You may enter up to 96 characters (including the tailing slash). The factory default is blank.

FTP/TFTP File Name (Target) - Enter the name you want to give the file being uploaded. You may enter up to 32 characters. The factory default is blank.

FTP/TFTP File Name (Source) - Specify the file witch you want to upload from IBP.

Start File Transfer - To initiate the upload you need to check this box and then select the Apply button.

Non-Configurable Data

The last row of the table is used to display information about the progress of the file transfer. The screen will refresh automatically until the file transfer completes.

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Command Buttons

Apply - Send the updated screen to the IBP perform the file upload.

8.2.4.3 Start-Up File

Specify the file used for starting up the system.

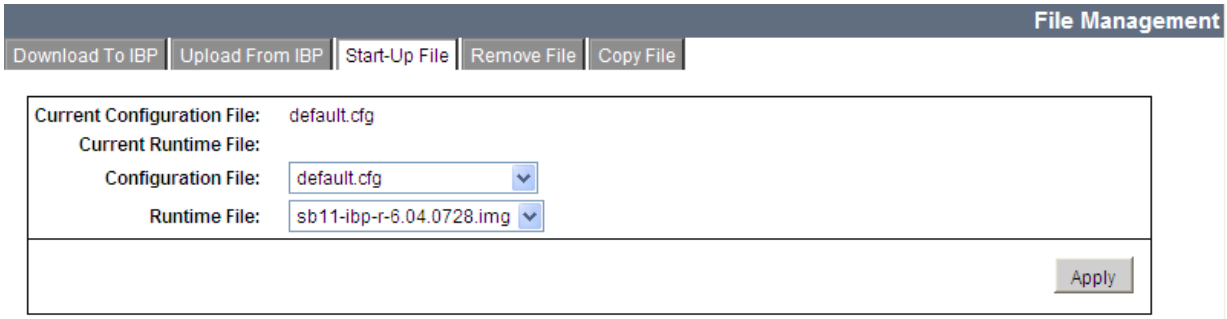

Figure : Start-Up File Config

Selection Criteria

Configuration File - Configuration files.

Runtime File - Run-time operation codes.

Non-Configurable Data

Current Configuration File - Current Configuration files.

Current Runtime File - Current Run-time operation codes.

Command Buttons

Apply - Send the updated screen to the IBP and specify the file start-up.

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8.2.4.4 Remove File

Delete files in flash. If the file is used for system startup, then this file cannot be deleted.

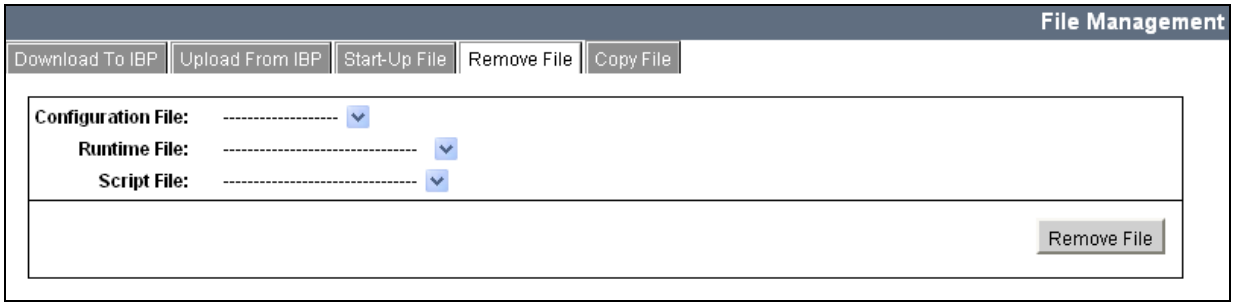

Figure : Remove File

Selection Criteria

Configuration File - Configuration files .

Runtime File - Run-time operation codes.

Script File - Configuration script files.

Command Buttons

Remove - Send the updated screen to the IBP and perform the file remove.

8.2.4.5 Copy File

Use this menu to copy a start-up configuration file from the running configuration file on IBP.

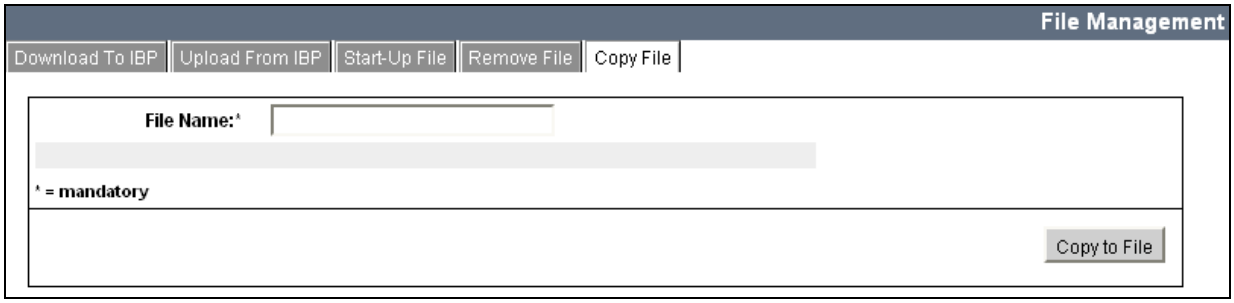

Figure : Copy File

Configurable Data

File Name - Enter the name you want to give the file being copied. You may enter up to 30 characters. The factory default is blank.

Non-Configurable Data

The last row of the table is used to display information about the progress of the file copy. The screen will refresh automatically until the file copy completes.

Command Buttons

Copy to File - Send the updated screen to the IBP perform the file copy.

8.2.5 User Management

8.2.5.1 User Accounts

By default, two user accounts exist:

- admin, with 'Read/Write' privileges
- guest, with 'Read Only' privileges

By default, password of admin user is “admin” and guest’s is blank. The names are not case sensitive.

If you logon with a user account with 'Read/Write' privileges (i.e. as admin) you can use the User Accounts screen to assign passwords and set security parameters for the default accounts, and to add and delete accounts (other than admin) up to the maximum of six.

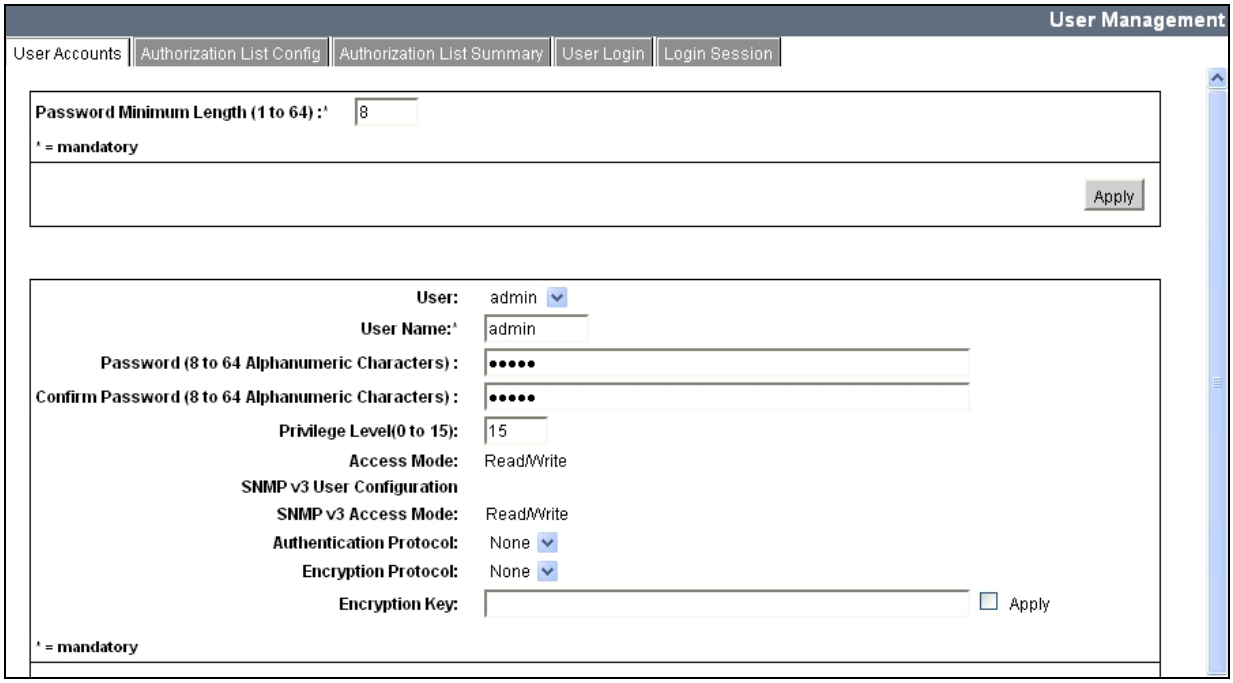

Figure : User Accounts Config

Selection Criteria

User - You can use this screen to reconfigure an existing account, or to create a new one. Use this pull down menu to select one of the existing accounts, or select 'Create' to add a new one, provided the maximum of five 'Read Only' accounts has not been reached.

Authentication Protocol - Specify the SNMPv3 Authentication Protocol setting for the selected user account. The valid Authentication Protocols are None, MD5 or SHA. If you select None, the user will be unable to access the SNMP data from an SNMP browser. If you select MD5 or SHA, the user login password will be used as the SNMPv3 authentication password, and you must therefore specify a password, and it must be eight characters long.

Encryption Protocol - Specify the SNMPv3 Encryption Protocol setting for the selected user account. The valid Encryption Protocols are None or DES. If you select the DES Protocol you must enter a key in the Encryption Key field. If None is specified for the Protocol, the Encryption Key is ignored.

Configurable Data

Password Minimum Length - You can use this screen to set minimum password length and this configured only support user account setting.

User Name - Enter the name you want to give to the new account. (You can only enter data in this field when you are creating a new account.) User names are up to eight characters in length and are not case sensitive. Valid characters include all the alphanumeric characters as well as the dash ('-') and underscore ('_') characters.User name "default" is not valid.

Password - Enter the optional new or changed password for the account. It will not display as it is typed, only asterisks(*) will show. Passwords are up to eight alpha numeric characters in length, and are case sensitive.

Confirm Password - Enter the password again, to confirm that you entered it correctly. This field will not display, but will show asterisks (*)

Privilege Level – Enter a privlelge level for the accont. It will define the access right for the account and only the highest value 15 has read/write access right.

Encryption Key - If you selected DES in the Encryption Protocol field enter the SNMPv3 Encryption Key here. Otherwise this field is ignored. Valid keys are 8 to 64 characters long. The Apply checkbox must be checked in order to change the Encryption Protocol and Encryption Key.

Non-Configurable Data

Access Mode - Indicates the user's access mode. The admin account always has 'Read/Write' access, and all other accounts have 'Read Only' access.

SNMP v3 Access Mode - Indicates the SNMPv3 access privileges for the user account. The admin account always has 'Read/Write' access, and all other accounts have 'Read Only' access.

Command Buttons

Apply - Update the IBP with the values on this screen. If you want the IBP to retain the new values across a power cycle, you must perform a save.

Delete - Delete the currently selected user account. If you want the IBP to retain the new values across a power cycle, you must perform a save. This button is only visible when you have selected a user account with 'Read Only' access. You cannot delete the 'Read/Write' user.

8.2.5.2 Authorization List Config

You use this screen to configure login lists. A login list specifies the authorization method(s) you want used to validate switch or port access for the users associated with the list. The pre-configured users, admin and guest, are assigned to a pre-configured list named defaultList, which you may not delete. All newly created users are also assigned to the defaultList until you specifically assign them to a different list.

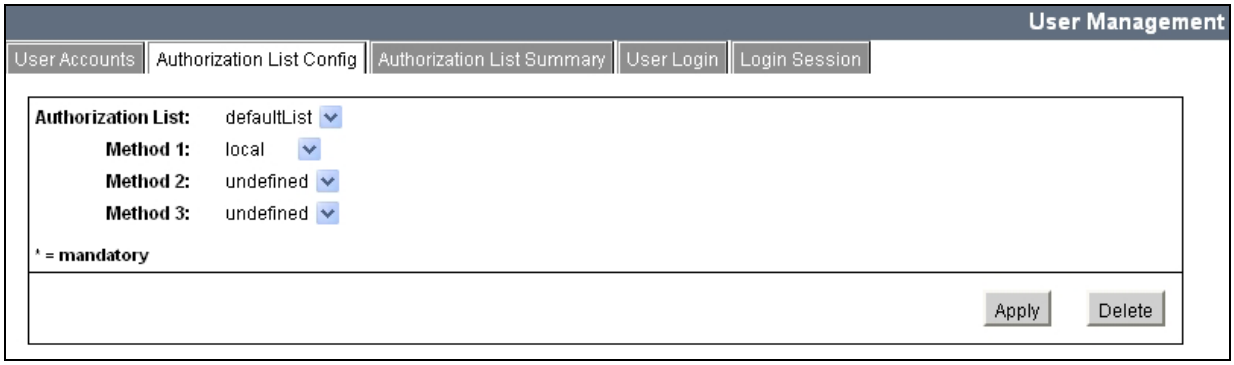

Figure : Authorization List Config

Selection Criteria

Authorization List - Select the authorization login list you want to configure. Select 'create' to define a new login list. When you create a new login list, 'local' is set as the initial authorization method.

Method 1 - Use the dropdown menu to select the method that should appear first in the selected authorization login list. If you select a method that does not time out as the first method, such as 'local' no other method will be tried, even if you have specified more than one method. Note that this parameter will not appear when you first create a new login list. The options are:

- **Local** - the user's locally stored ID and password will be used for authorization
- **Radius** - the user's ID and password will be authorizated using the RADIUS server instead of locally
- **TACACS+** - the user's ID and password will be authorizated using the TACACS+ server
- **LDAP**- the user's ID and password will be authorizated using the LDAP server
- **Reject** - the user is never authorizated
- **Undefined** - the authorzation method is unspecified (this may not be assigned as the first method)

Method 2 - Use the dropdown menu to select the method, if any, that should appear second in the selected authorizationlogin list. This is the method that will be used if the first method times out. If you select a method that does not time out as the second method, the third method will not be tried. Note that this parameter will not appear when you first create a new login list.

Method 3 - Use the dropdown menu to select the method, if any, that should appear third in the selected authentication login list. Note that this parameter will not appear when you first create a new login list.

Configurable Data

Authorization List Name - If you are creating a new login list, enter the name you want to assign. It can be up to 15 alphanumeric characters long and is not case sensitive.

Command Buttons

Apply - Send the updated screen to the switch and cause the changes to take effect on the switch. These changes will not be retained across a power cycle unless you perform a save.

Delete - Remove the selected authorization login list from the configuration. The delete will fail if the selected login list is assigned to any user (including the default user) for system login or IEEE 802.1x port access control. You can only use this button if you have Read/Write access. The change will not be retained across a power cycle unless you perform a save.

8.2.5.3 Authorization List Summary

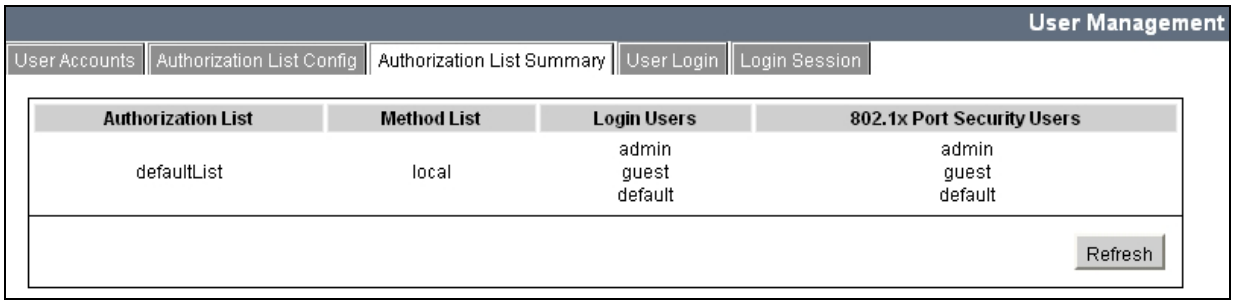

Figure : Authentication List Summary

Non-Configurable Data

Authorization List - Identifies the authorization login list summarized in this row.

Method List - The ordered list of methods configured for this login list.

Login Users - The users you assigned to this login list on the User Login Configuration screen. This list is used to authorizate the users for system login access.

802.1x Port Security Users The users you assigned to this login list on the Port Access Control User Login Configuration screen - This list is used to authenticate the users for port access, using the IEEE 802.1x protocol.

Command Buttons

Refresh - Update the information on the page.

8.2.5.4 User Login

Each configured user is assigned to a login list that specifies how the user should be authenticated when attempting to access the IBP or a port on the IBP. After creating a new user account on the User Account screen, you should assign that user to a login list for the IBP using this screen and, if necessary, to a login list for the ports using the Port Access Control User Login Configuration screen. If you need to create a new login list for the user, you would do so on the Authentication List Configuration page.

The pre-configured users, admin and guest, are assigned to a pre-configured list named defaultList, which you may not delete. All newly created users are also assigned to the defaultList until you specifically assign them to a different list.

A user that does not have an account configured on the IBP is termed the 'default' or 'non-configured' user. If you assign the 'non-configured user' to a login list that specifies authentication via the RADIUS server, you will not need to create an account for all users on each IBP. However, by default the 'non-configured user' is assigned to 'defaultList', which by default uses local authentication.

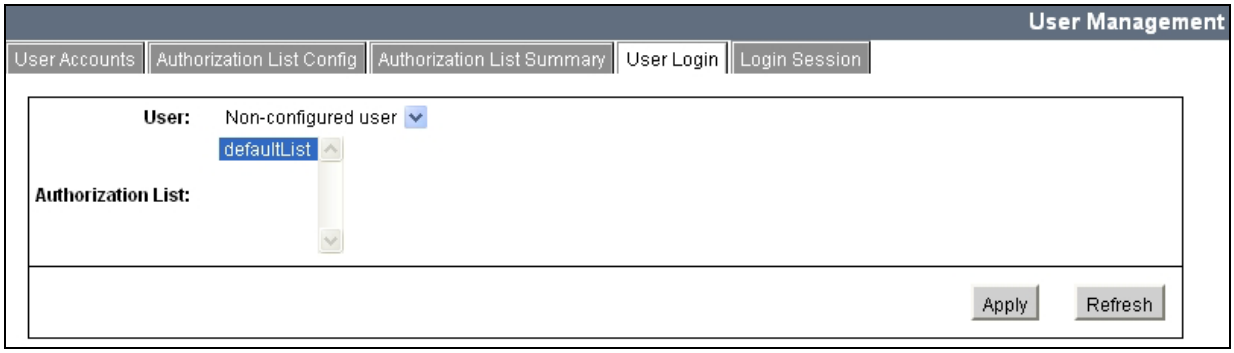

Figure : User Login Config

Selection Criteria

User - Select the user you want to assign to a login list. Note that you must always associate the admin user with the default list. This forces the admin user to always be authenticated locally to prevent full lockout from IBP configuration. If you assign a user to a login list that requires remote authentication, the user's access to the IBP from all CLI, web, and telnet sessions will be blocked until the authentication is complete. Refer to the discussion of maximum delay in the RADIUS configuration help.

Configurable Data

Authorization List - Select the authorization login list you want to assign to the user for system login.

Command Buttons

Apply - Send the updated screen to the IBP and cause the changes to take effect on the IBP. These changes will not be retained across a power cycle unless you perform a save.

Refresh - Update the information on the page.

8.2.5.5 Login Session

This page will display the login session information including user name, connection from, idle time, session time, and session type.

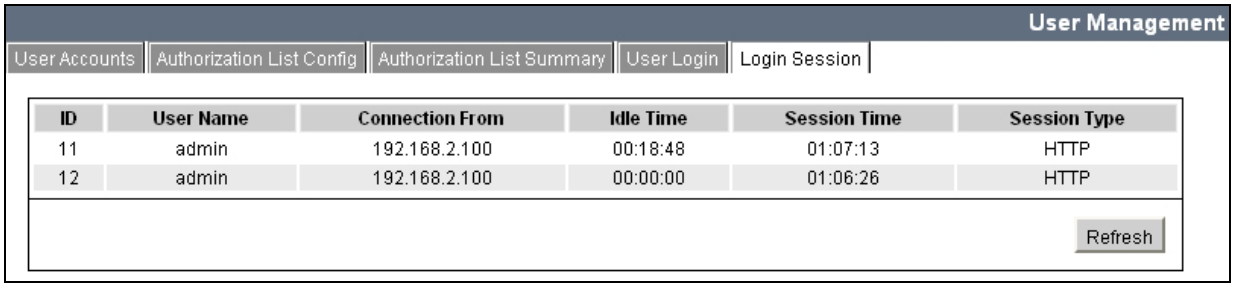

Figure : Login Session

Non-Configurable Data

ID - Identifies the ID of this row.

User Name - Shows the user name of user made the session.

Connection From - Shows the user is connected from which machine.

Idle Time - Shows the idle session time.

Session Time - Shows the total session time.

Session Type - Shows the type of session: telnet, serial port, SSH or HTTP.

Command Buttons

Refresh - Update the information on the page.

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8.2.6 Logging

8.2.6.1 Configuring Buffered Log

This log stores messages in memory based upon the settings for message component and severity. On stackable systems, this log exists only on the top of stack platform. Other platforms in the stack forward their messages to the top of stack log.

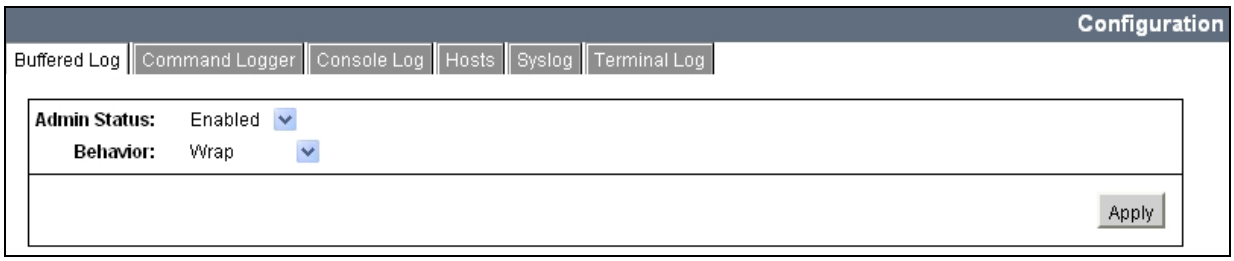

Figure : Buffered Log Config

Configurable Data

Admin Status - A log that is "Disabled" shall not log messages. A log that is "Enabled" shall log messages. Enable or Disable logging by selecting the corresponding line on the pull down entry field.

Behavior Indicates the behavior of the log when it is full. It can either wrap around or stop when the log space is filled.

Command Buttons

Apply - Update the IBP with the values you entered.

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8.2.6.2 Configuring Command Logger

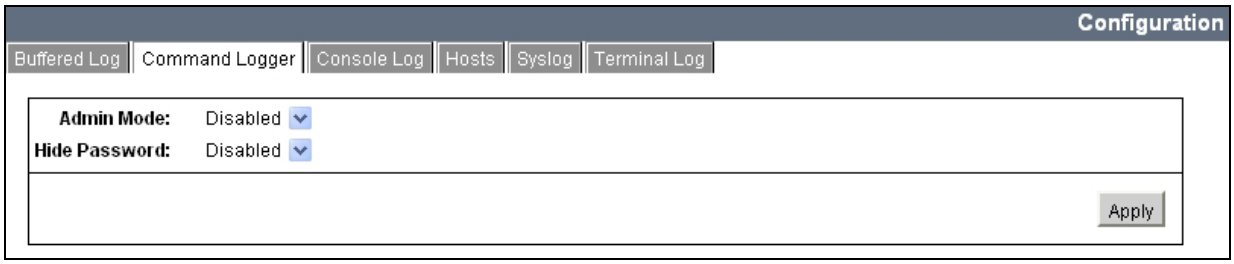

Figure : Command Logger Config

Selection Criteria

Admin Mode - Enable/Disable the operation of the CLI Command logging by selecting the corresponding pull down field and clicking Apply.

Hide Password - Hide password if showing logging entries. Enable/Disable the operation by selecting the corresponding pulldown field and clicking Apply.

Command Buttons

Apply - Update the IBP with the values you entered.

8.2.6.3 Configuring Console Log

This allows the messages logging to any serial device attached to the host.

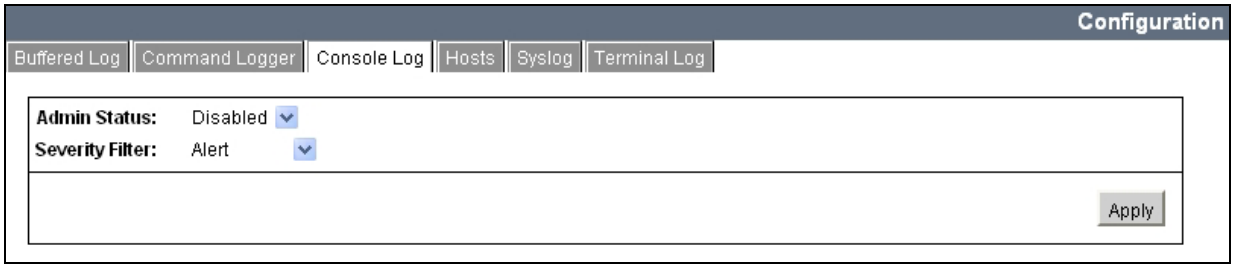

Figure : Console Log Config

Selection Criteria

Admin Status - A log that is "Disabled" shall not log messages. A log that is "Enabled" shall log messages. Enable or Disable logging by selecting the corresponding line on the pull down entry field.

Severity Filter - A log records messages equal to or above a configured severity threshold. Select the severity option by selecting the corresponding line on the pull down entry field. These severity levels have been enumerated below:

- Emergency (0): system is unusable
- Alert (1): action must be taken immediately
- Critical (2): critical conditions
- Error (3): error conditions
- Warning (4): warning conditions
- Notice(5): normal but significant conditions
- Informational(6): informational messages
- Debug(7): debug-level messages

Command Buttons

Apply - Update the IBP with the values you entered.

8.2.6.4 Configuring Hosts

This allows to configure to send the logged messages to a host.

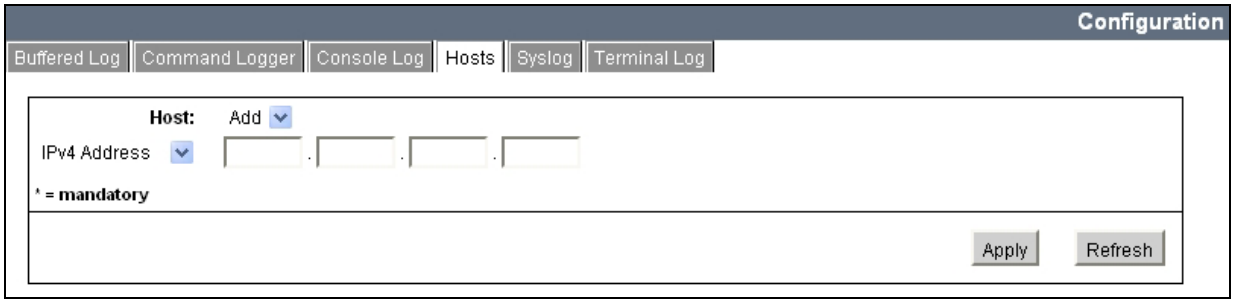

Figure : Logging Hosts Config

Selection Criteria

Host - This is a list of the hosts that have been configured for syslog. Select a host for changing the configuration or choose to add a new hosts from the drop down list.

Severity Filter - A log records messages equal to or above a configured severity threshold. Select the severity option by selecting the corresponding line on the pull down entry field. These severity levels have been enumerated below:

- Emergency (0): system is unusable
- Alert (1): action must be taken immediately
- Critical (2): critical conditions
- Error (3): error conditions
- Warning (4): warning conditions
- Notice(5): normal but significant conditions
- Informational(6): informational messages
- Debug(7): debug-level messages

Configurable Data

IPv4 Address - This is the IPv4 address of the host configured for syslog.

Host Name - This is the IPv4 Host Name of the host configured for syslog.

Host Name V6 - This is the IPv6 Host Name of the host configured for syslog.

IPv6 Address - This is the IPv6 address of the host configured for syslog.

Port -This is the port on the host to which syslog messages are sent. The default port is 514. Specify the port in the text field.

Non Configurable Data

Status -This specifies wether the host has been configured to be actively logging or not.

Command Buttons

Apply - Update the IBP with the values you entered.

Refresh - Refetch the database and display it again starting with the first entry in the table.

Delete - Delete a configured host.

8.2.6.5 Configuring Syslog

To enable the syslog system on the system, the logged messages will be sent to the host specified on the “Hosts“ page.

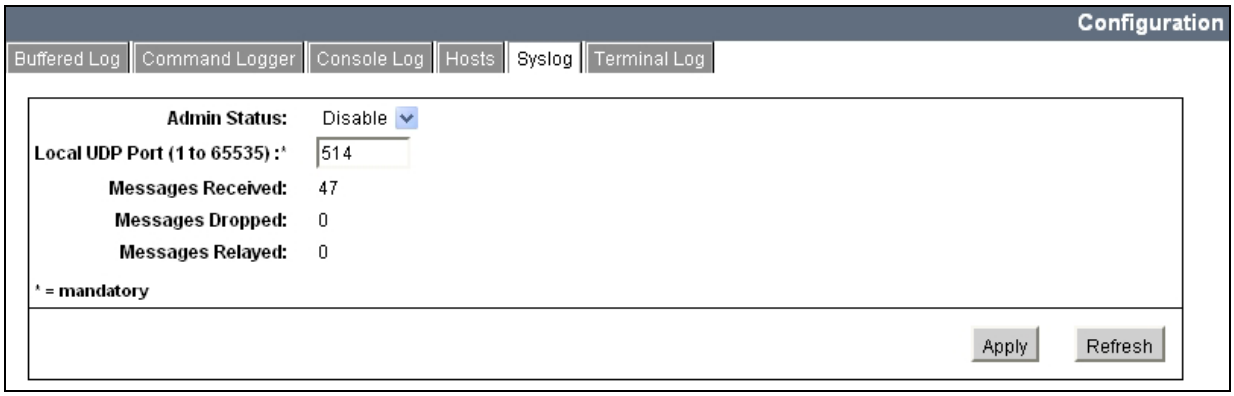

Figure : Syslog Config

Selection Criteria

Admin Status -For Enabling and Disabling logging to configured syslog hosts. Setting this to disable stops logging to all syslog hosts. Disable means no messages will be sent to any collector/relay. Enable means messages will be sent to configured collector/relays using the values configured for each collector/relay. Enable/Disable the operation of the syslog function by selecting the corresponding line on the pull down entry field.

Configurable Data

Local UDP Port This is the port on the local host from which syslog messages are sent. The default port is 514. Specify the local port in the text field.

Non-Configurable Data

Messages Received - The number of messages received by the log process. This includes messages that are dropped or ignored.

Messages Dropped - The number of messages that could not be processed due to error or lack of resources.

Messages Relayed - The number of messages forwarded by the syslog function to a syslog host. Messages forwarded to multiple hosts are counted once for each host.

Command Buttons

Apply - Update the IBP with the values you entered.

Refresh - Refetch the database and display it again starting with the first entry in the table.

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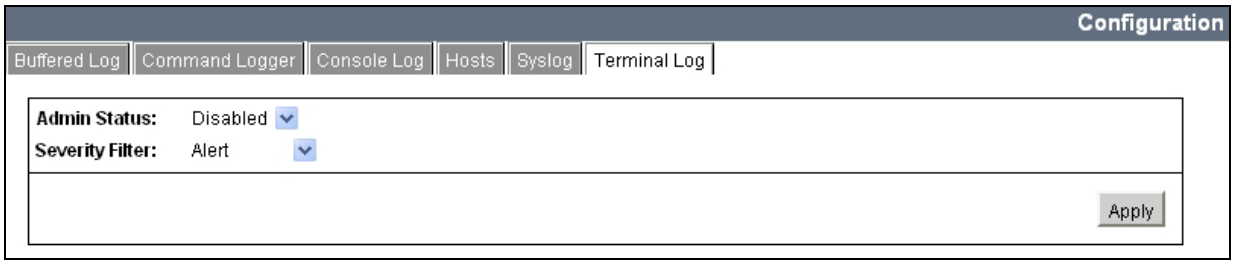
8.2.6.6 Configuring Terminal Log

This allows logging to any terminal client connected to the switch via telnet or SSH. To receive the log messages, terminals have to enable "terminal monitor" via CLI command.



Selection Criteria

Admin Status -A log that is "Disabled" shall not log messages to connected terminals. A log that is "Enabled" shall log messages to connected terminals. Enable or Disable logging by selecting the corresponding line on the pulldown entry field.

Severity Filter - A log records messages equal to or above a configured severity threshold. Select the severity option by selecting the corresponding line on the pulldown entry field. These severity levels have been enumerated below:
-Emergency (0): system is unusable
-Alert (1): action must be taken immediately
-Critical (2): critical conditions
-Error (3): error conditions
-Warning (4): warning conditions
-Notice(5): normal but significant conditions
-Informational(6): informational messages
-Debug(7): debug-level messages

Command Buttons

Apply - Update the IBP with the values you entered.

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8.2.6.7 Viewing Buffered Log

This help message applies to the format of all logged messages which are displayed for the buffered log, persistent log or console log.

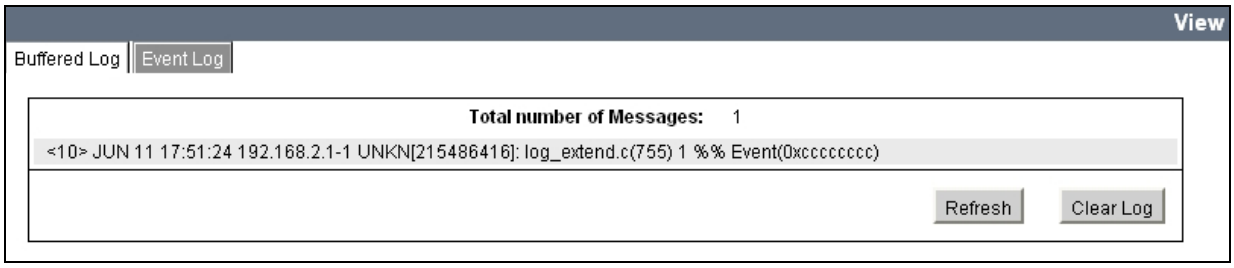

Figure : Viewing Buffered Log

Format of the messages

Messages logged to a collector or relay via syslog have an identical format:

<15>Aug 24 05:34:05 0.0.0.0-1 MSTP[2110]: mspt_api.c(318) 237 %% Interface 12 transitioned to root state on message age timer expiry

-The above example indicates a message with severity 7 (15 mod 8) (debug) on a system that is generated by component MSTP running in thread id 2110 on Aug 24 05:34:05 by line 318 of file mstp_api.c. This is the 237th message logged with system IP 0.0.0.0 and unit number 1.

Number of log messages displayed: For the buffered log, only the latest 128 entries are displayed on the webpage

Command Buttons

Refresh - Refresh the page with the latest log entries.

Clear Log - Clear all entries in the log.

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8.2.6.8 Viewing Event Log

Use this panel to display the event log, which is used to hold error messages for catastrophic events. After the event is logged and the updated log is saved in FLASH memory, the IBP will be reset. The log can hold at least 10080 entries (the actual number depends on the platform and OS), and is erased when an attempt is made to add an entry after it is full. The event log is preserved across system resets.

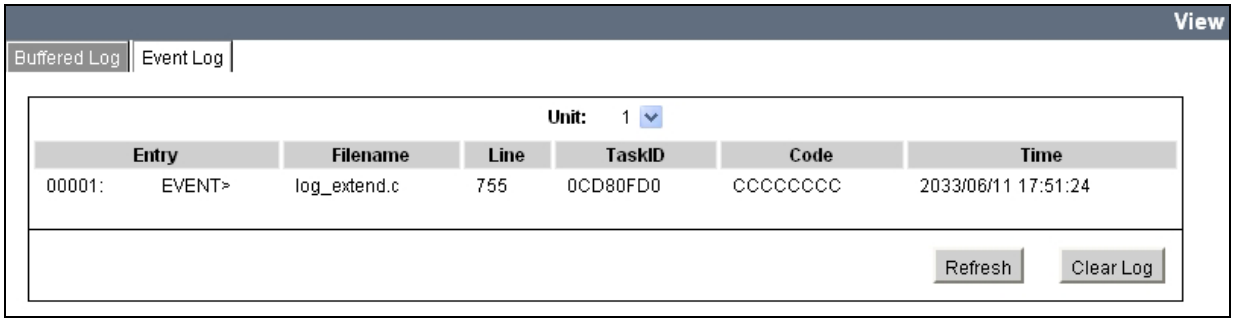

Figure : Viewing Event Log

Non-Configurable Data

Entry - The number of the entry within the event log. The most recent entry is first.

Filename - The source code filename identifying the code that detected the event.

Line - The line number within the source file of the code that detected the event.

Task ID - The OS-assigned ID of the task reporting the event.

Code - The event code passed to the event log handler by the code reporting the event.

Time - The time the event occurred, measured from the previous reset.

Command Buttons

Refresh - Refresh the page with the latest log entries.

Clear Log - Clear all entries in the log.

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8.2.7 Statistics

8.2.7.1 Switch Summary

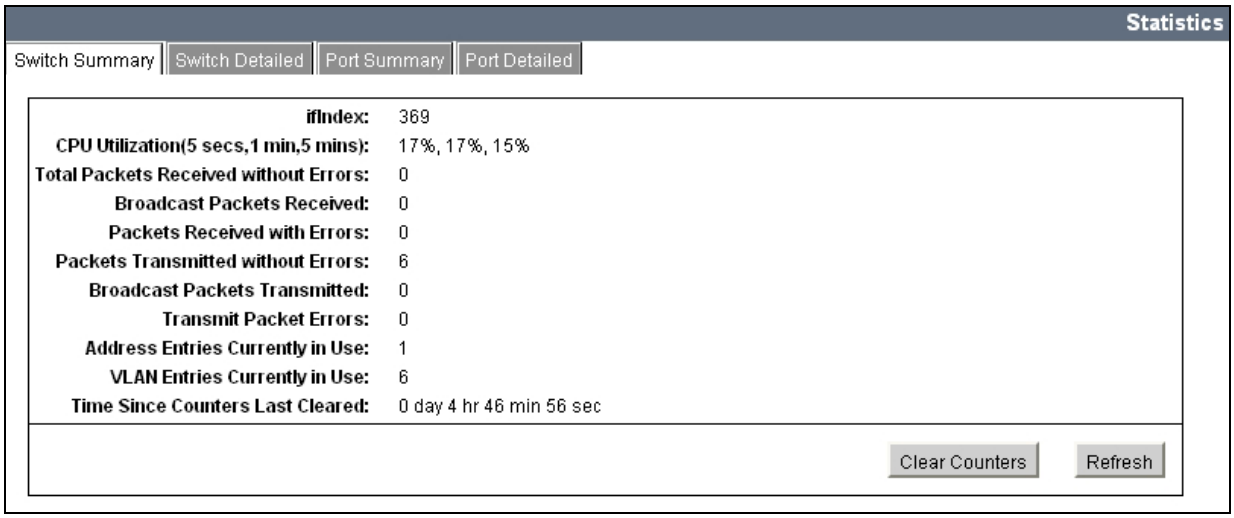
Statistics
Switch Summary
Switch Detailed
Port Summary
Port Detailed
ifIndex: 369
CPU Utilization(5 secs,1 min,5 mins): 17%, 17%, 15%
Total Packets Received without Errors: 0
Broadcast Packets Received: 0
Packets Received with Errors: 0
Packets Transmitted without Errors: 6
Broadcast Packets Transmitted: 0
Transmit Packet Errors: 0
Address Entries Currently in Use: 1
VLAN Entries Currently in Use: 6
Time Since Counters Last Cleared: 0 day 4 hr 46 min 56 sec
Clear Counters
Refresh

Figure : IBP Summary Statistics

Non-Configurable Data

ifIndex - This object indicates the ifIndex of the interface table entry associated with the Processor of this IBP.

CPU Utilization(5 secs,1 min,5 mins) - This value indicates the CPU Utilization for five seconds, one minute and five minutes.

Total Packets Received Without Errors - The total number of packets (including broadcast packets and multicast packets) received by the processor.

Broadcast Packets Received - The total number of packets received that were directed to the broadcast address. Note that this does not include multicast packets.

Packets Received With Error - The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.

Packets Transmitted Without Errors - The total number of packets transmitted out of the interface.

Broadcast Packets Transmitted - The total number of packets that higher-level protocols requested to be transmitted to the Broadcast address, including those that were discarded or not sent.

Transmit Packet Errors - The number of outbound packets that could not be transmitted because of errors.

Address Entries Currently in Use - The total number of Forwarding Database Address Table entries now active on the IBP, including learned and static entries.

VLAN Entries Currently in Use - The number of VLAN entries presently occupying the VLAN table.

Time Since Counters Last Cleared - The elapsed time, in days, hours, minutes, and seconds since the statistics for this IBP were last cleared.

Command Buttons

Clear Counters - Clear all the counters, resetting all summary and IBP detailed statistics to defaults. The discarded packets count cannot be cleared.

Refresh - Refresh the data on the screen with the present state of the data in the IBP.

8.2.7.2 Switch Detailed

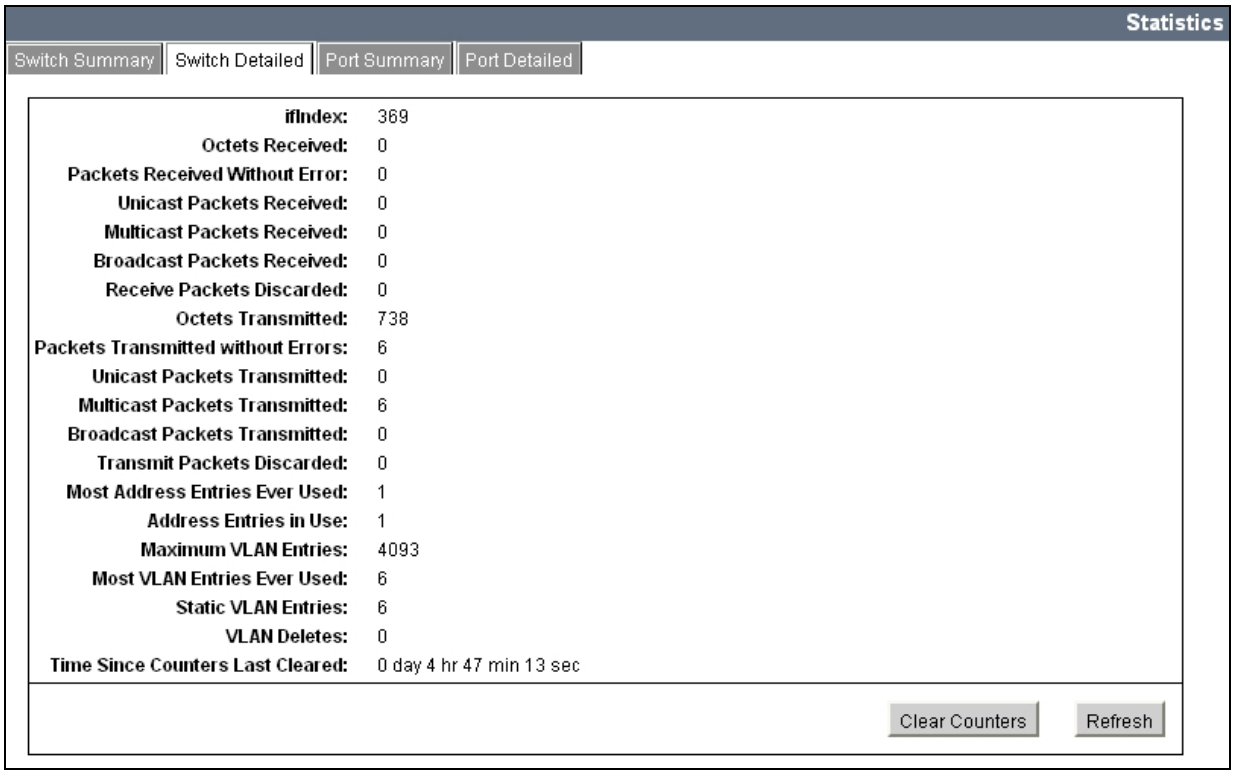

Figure : IBP Detailed Statistics

Non-Configurable Data

ifIndex - This object indicates the ifIndex of the interface table entry associated with the Processor of this IBP.

Octets Received - The total number of octets of data received by the processor (excluding framing bits but including FCS octets).

Packets Received Without Errors - The total number of packets (including broadcast packets and multicast packets) received by the processor.

Unicast Packets Received - The number of subnetwork-unicast packets delivered to a higher-layer protocol.

Multicast Packets Received - The total number of packets received that were directed to a multicast address. Note that this number does not include packets directed to the broadcast address.

Broadcast Packets Received - The total number of packets received that were directed to the broadcast address. Note that this does not include multicast packets.

Receive Packets Discarded - The number of inbound packets which were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol. A possible reason for discarding a packet could be to free up buffer space.

Octets Transmitted - The total number of octets transmitted out of the interface, including framing characters.

Packets Transmitted Without Errors - The total number of packets transmitted out of the interface.

Unicast Packets Transmitted - The total number of packets that higher-level protocols requested be transmitted to a subnetwork-unicast address, including those that were discarded or not sent.

Multicast Packets Transmitted - The total number of packets that higher-level protocols requested be transmitted to a Multicast address, including those that were discarded or not sent.

Broadcast Packets Transmitted - The total number of packets that higher-level protocols requested be transmitted to the Broadcast address, including those that were discarded or not sent.

Transmit Packets Discarded - The number of outbound packets which were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol. A possible reason for discarding a packet could be to free up buffer space.

Most Address Entries Ever Used - The highest number of Forwarding Database Address Table entries that have been learned by this IBP since the most recent reboot.

Address Entries in Use - The number of Learned and static entries in the Forwarding Database Address Table for this IBP.

Maximum VLAN Entries - The maximum number of Virtual LANs (VLANs) allowed on this IBP.

Most VLAN Entries Ever Used - The largest number of VLANs that have been active on this IBP since the last reboot.

Static VLAN Entries - The number of presently active VLAN entries on this IBP that have been created statically.

VLAN Deletes - The number of VLANs on this IBP that have been created and then deleted since the last reboot.

Time Since Counters Last Cleared - The elapsed time, in days, hours, minutes, and seconds, since the statistics for this IBP were last cleared.

Command Buttons

Clear Counters - Clear all the counters, resetting all IBP summary and detailed statistics to default values. The discarded packets count cannot be cleared.

Refresh - Refresh the data on the screen with the present state of the data in the IBP.

8.2.7.3 Port Summary

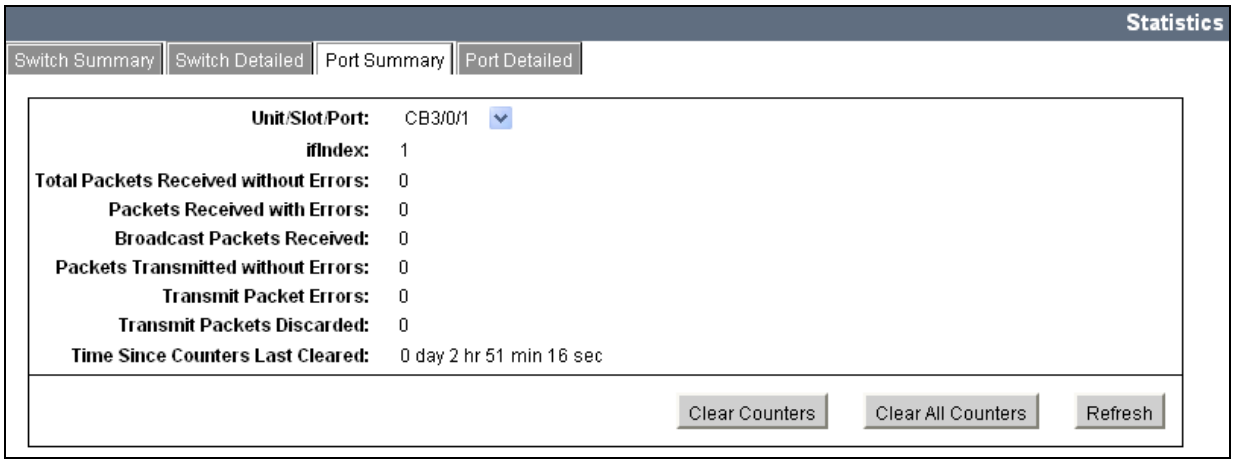

Figure : Port Summary Statistics

Selection Criteria

Unit/Slot/Port - Selects the interface for which data is to be displayed or configured.

Non-Configurable Data

ifIndex - This object indicates the ifIndex of the interface table entry associated with this port on an adapter.

Total Packets Received Without Errors - The total number of packets received that were without errors.

Packets Received With Error - The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.

Broadcast Packets Received - The total number of good packets received that were directed to the broadcast address. Note that this does not include multicast packets.

Packets Transmitted Without Errors - The number of frames that have been transmitted by this port to its segment.

Transmit Packet Errors - The number of outbound packets that could not be transmitted because of errors.

Transmit Packets Discarded - The best estimate of the total number of collisions on this Ethernet segment.

Time Since Counters Last Cleared - The elapsed time, in days, hours, minutes, and seconds since the statistics for this port were last cleared.

Command Buttons

Clear Counters - Clear all the counters, resetting all statistics for this port to default values.

Clear All Counters - Clear all the counters for all ports, resetting all statistics for all ports to default values.

Refresh - Refresh the data on the screen with the present state of the data in the IBP.

8.2.7.4 Port Detailed

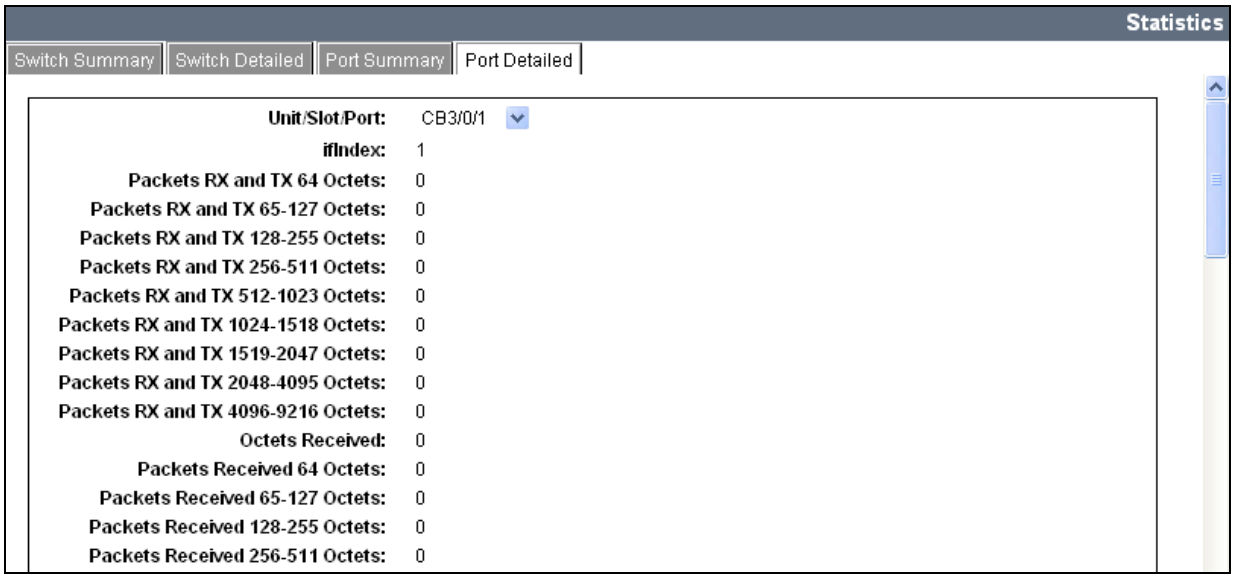
Statistics
Switch Summary
Switch Detailed
Port Summary
Port Detailed
Unit/Slot/Port: CB3/0/1
ifIndex: 1
Packets RX and TX 64 Octets: 0
Packets RX and TX 65-127 Octets: 0
Packets RX and TX 128-255 Octets: 0
Packets RX and TX 256-511 Octets: 0
Packets RX and TX 512-1023 Octets: 0
Packets RX and TX 1024-1518 Octets: 0
Packets RX and TX 1519-2047 Octets: 0
Packets RX and TX 2048-4095 Octets: 0
Packets RX and TX 4096-9216 Octets: 0
Octets Received: 0
Packets Received 64 Octets: 0
Packets Received 65-127 Octets: 0
Packets Received 128-255 Octets: 0
Packets Received 256-511 Octets: 0

Figure : Port Detailed Statistics

Selection Criteria

Unit/Slot/Port - Selects the interface for which data is to be displayed or configured.

Non-Configurable Data

ifIndex - This object indicates the ifIndex of the interface table entry associated with this port on an adapter.

Packets RX and TX 64 Octets - The total number of packets (including bad packets) received or transmitted that were 64 octets in length (excluding framing bits but including FCS octets).

Packets RX and TX 65-127 Octets - The total number of packets (including bad packets) received or transmitted that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 128-255 Octets - The total number of packets (including bad packets) received or transmitted that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 256-511 Octets - The total number of packets (including bad packets) received or transmitted that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 512-1023 Octets - The total number of packets (including bad packets) received or transmitted that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 1024-1518 Octets - The total number of packets (including bad packets) received or transmitted that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 1519-2047 Octets - The total number of packets (including bad packets) received or transmitted that were between 1519 and 2047 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 2048-4095 Octets - The total number of packets (including bad packets) received or transmitted that were between 2048 and 4095 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 4096-9216 Octets - The total number of packets (including bad packets) received or transmitted that were between 4096 and 9216 octets in length inclusive (excluding framing bits but including FCS octets).

Octets Received - The total number of octets of data (including those in bad packets) received on the network (excluding framing bits but including FCS octets). This object can be used as a reasonable estimate of Ethernet utilization. If greater precision is desired, the etherStatsPkts and etherStatsOctets objects should be sampled before and after a common interval.

Packets Received 64 Octets - The total number of packets (including bad packets) received that were 64 octets in length (excluding framing bits but including FCS octets).

Packets Received 65-127 Octets - The total number of packets (including bad packets) received that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Received 128-255 Octets - The total number of packets (including bad packets) received that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Received 256-511 Octets - The total number of packets (including bad packets) received that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Received 512-1023 Octets - The total number of packets (including bad packets) received that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Received 1024-1518 Octets - The total number of packets (including bad packets) received that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Received > 1518 Octets - The total number of packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets) and were otherwise well formed.

Total Packets Received Without Errors - The total number of packets received that were without errors.

Unicast Packets Received - The number of subnetwork-unicast packets delivered to a higher-layer protocol.

Multicast Packets Received - The total number of good packets received that were directed to a multicast address. Note that this number does not include packets directed to the broadcast address.

Broadcast Packets Received - The total number of good packets received that were directed to the broadcast address. Note that this does not include multicast packets.

Total Packets Received with MAC Errors - The total number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.

Jabbers Received - The total number of packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error). Note that this definition of jabber is different than the definition in IEEE-802.3 section 8.2.1.5 (10BASE5) and section 10.3.1.4 (10BASE2). These documents define jabber as the condition where any packet exceeds 20 ms. The allowed range to detect jabber is between 20 ms and 150 ms.

Undersize Received - The total number of packets received that were less than 64 octets in length with GOOD CRC(excluding framing bits but including FCS octets).

Fragments Received - The total number of packets received that were less than 64 octets in length with ERROR CRC(excluding framing bits but including FCS octets).

Alignment Errors - The total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had a bad Frame Check Sequence (FCS) with a non-integral number of octets.

Rx FCS Errors - The total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had a bad Frame Check Sequence (FCS) with an integral number of octets

Overruns - The total number of frames discarded as this port was overloaded with incoming packets, and could not keep up with the inflow.

Total Packets Transmitted (Octets) - The total number of octets of data (including those in bad packets) transmitted on the network (excluding framing bits but including FCS octets). This object can be used as a reasonable estimate of Ethernet utilization. If greater precision is desired, the etherStatsPkts and etherStatsOctets objects should be sampled before and after a common interval.

Packets Transmitted 64 Octets - The total number of packets (including bad packets) received that were 64 octets in length (excluding framing bits but including FCS octets).

Packets Transmitted 65-127 Octets - The total number of packets (including bad packets) received that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Transmitted 128-255 Octets - The total number of packets (including bad packets) received that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Transmitted 256-511 Octets - The total number of packets (including bad packets) received that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Transmitted 512-1023 Octets - The total number of packets (including bad packets) received that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Transmitted 1024-1518 Octets - The total number of packets (including bad packets) received that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).

Maximum Frame Size - The maximum Ethernet frame size the interface supports or is configured, including Ethernet header, CRC, and payload. --> (1518 to 9216). The default maximum frame size is 1518 .

Total Packets Transmitted Successfully - The number of frames that have been transmitted by this port to its segment.

Unicast Packets Transmitted - The total number of packets that higher-level protocols requested be transmitted to a subnetwork-unicast address, including those that were discarded or not sent.

Multicast Packets Transmitted - The total number of packets that higher-level protocols requested be transmitted to a Multicast address, including those that were discarded or not sent.

Broadcast Packets Transmitted - The total number of packets that higher-level protocols requested be transmitted to the Broadcast address, including those that were discarded or not sent.

Total Transmit Errors - The sum of Single, Multiple, and Excessive Collisions.

Tx FCS Errors - The total number of packets transmitted that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had a bad Frame Check Sequence (FCS) with an integral number of octets

Underrun Errors - The total number of frames discarded because the transmit FIFO buffer became empty during frame transmission.

Total Transmit Packets Discarded - The sum of single collision frames discarded, multiple collision frames discarded, and excessive frames discarded.

Single Collision Frames - A count of the number of successfully transmitted frames on a particular interface for which transmission is inhibited by exactly one collision.

Multiple Collision Frames - A count of the number of successfully transmitted frames on a particular interface for which transmission is inhibited by more than one collision.

Excessive Collision Frames - A count of frames for which transmission on a particular interface fails due to excessive collisions.

Packets Dropped by MMU - A count for the packets dropped by the MMU. There are reasons for MMU to drop packets, such as CBP full, HOL blocking, etc.

Time Since Counters Last Cleared - The elapsed time, in days, hours, minutes, and seconds since the statistics for this port were last cleared.

Command Buttons

Clear Counters - Clear all the counters, resetting all statistics for this port to default values.

Clear All Counters - Clear all the counters for all ports, resetting all statistics for all ports to default values.

Refresh - Refresh the data on the screen with the present state of the data in the IBP.

8.2.8 SNMP

8.2.8.1 Community Config

By default, two SNMP Communities exist:

- private, with 'Read/Write' privileges and status set to enable
- public, with 'Read Only' privileges and status set to enable

These are well-known communities, you can use this menu to change the defaults or to add other communities. Only the communities that you define using this menu will have access to the IBP using the SNMPv1 and SNMPv2c protocols. Only those communities with read-write level access will have access to this menu via SNMP.

You should use this menu when you are using the SNMPv1 and SNMPv2c protocol: if you want to use SNMP v3 you should use the User Accounts menu or SNMP User Config menu.

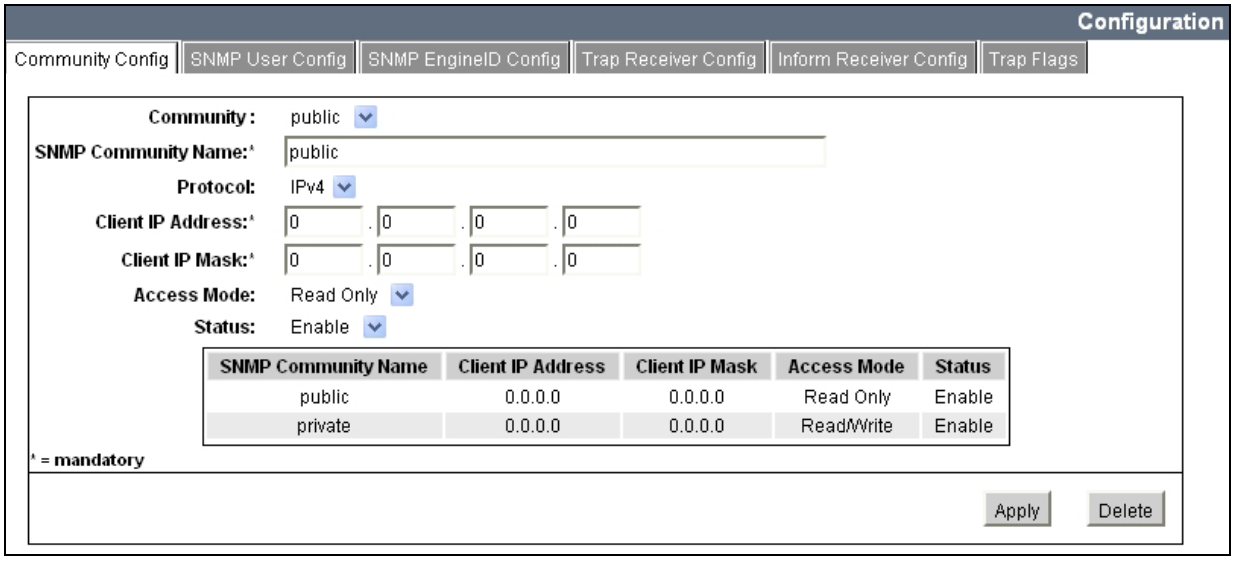

Figure : SNMP Community Config

Selection Criteria

Community - You can use this screen to reconfigure an existing community, or to create a new one. Use this pull down menu to select one of the existing community names, or select 'Create' to add a new one.

Protocol - Select IPv4 or IPv6 to configure the corresponding attributes.

Access Mode - Specify the access level for this community by selecting Read/Write or Read Only from the pull down menu.

Status - Specify the status of this community by selecting Enable or Disable from the pull down menu. If you select enable, the Community Name must be unique among all valid Community Names or the set request will be rejected. If you select disable, the Community Name will become invalid.

Configurable Data

SNMP Community Name - The Snmp Community Name, it identifies each SNMP community. Community names in the SNMP community must be unique. A valid entry is a case-sensitive string of up to 16 characters.

Client IP Address - Taken together, the Client IP Address and Client IP Mask denote a range of IP addresses from which SNMP clients may use that community to access this device. If either (IP Address or IP Mask) value is 0.0.0.0, access is allowed from any IP address. Otherwise, every client's IP address is ANDed with the mask, as is the Client IP Address, and, if the values are equal, access is allowed. For example, if the Client IP Address and Client IP Mask parameters are 192.168.1.0/255.255.255.0, then any client whose IP address is 192.168.1.0 through 192.168.1.255 (inclusive) will be allowed access. To allow access from only one station, use a Client IP Mask value of 255.255.255.255, and use that machine's IP address for Client IP Address.

Client IP Mask - Taken together, the Client IP Address and Client IP Mask denote a range of IP addresses from which SNMP clients may use that community to access this device. If either (IP Address or IP Mask) value is 0.0.0.0, access is allowed from any IP address. Otherwise, every client's IP address is ANDed with the mask, as is the Client IP Address, and, if the values are equal, access is allowed. For example, if the Client IP Address and Client IP Mask parameters are 192.168.1.0/255.255.255.0, then any client whose IP address is 192.168.1.0 through 192.168.1.255 (inclusive) will be allowed access. To allow access from only one station, use a Client IP Mask value of 255.255.255.255, and use that machine's IP address for Client IP Address.

IP Address - The combination of IPv6 Prefix and IPv6 Prefix length denote a range of IP Addresses from which SNMP clients may use that community to access this device.

Command Buttons

Apply - Update the IBP with the values on this screen. If you want the IBP to retain the new values across a power cycle, you must perform a save.

Delete - Delete the currently selected Community Name. If you want the IBP to retain the new values across a power cycle, you must perform a save.

8.2.8.2 SNMP User Config

This menu will display an entry for every SNMP user.

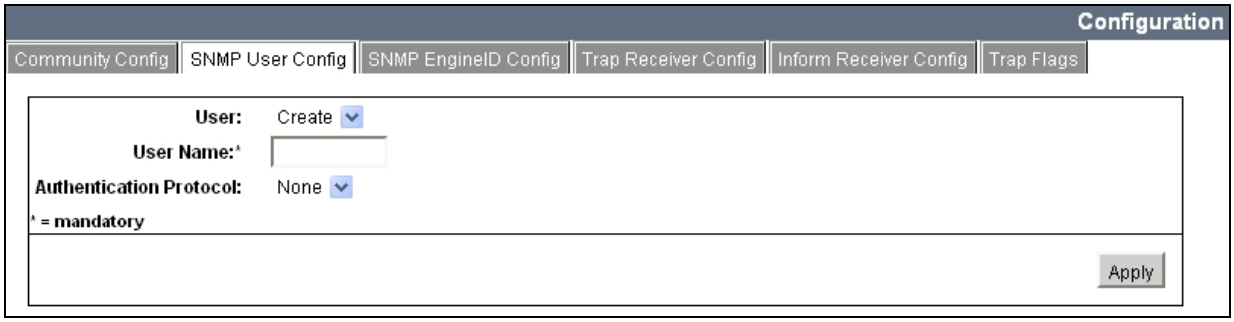

Figure : SNMP User Config

Selection Criteria

User - You can use this screen to reconfigure an existing SNMP user, or to create a new one. Use this pulldown menu to select one of the existing SNMP user, or select 'Create' to add a new one.

Authentication Protocol - Specify the SNMPv3 Authentication Protocol setting for the selected user account. The valid Authentication Protocols are None, MD5 or SHA.

Encryption Protocol - Specify the SNMPv3 Encryption Protocl setting for the selected user account. The valid Encryption Protocol are None or DES.

Configurable Data

User Name - Enter SNMP user name you want to create. (You can only enter data in this field when you are creating a new account.) User names are up to 8 characters in length and are case insensitive. Valid characters include all alphanumeric characters as well as the dash ('-') and underscore ('_') characters.

Authentication Passowrd - Enter new or changed password for the authentication protocol for this SNMP user. Passwords are up to eight alphanumeric characters in length and are case sensitive.

Encryption Password - Enter new or changed password for the encryption protocol for this SNMP user. Passwords are up to 64 alphanumeric characters in length and are case sensitive.

Command Buttons

Apply - Update the switch with the values on this screen. If you want the switch to retain the new values across a power cycle, you must perform a save.

Delete - Delete the currently selected SNMP User. If you want the switch to retain the new values across a power cycle, you must perform a save.

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8.2.8.3 SNMP EngineID Config

This menu will display an entry for configuring remote Engine ID.

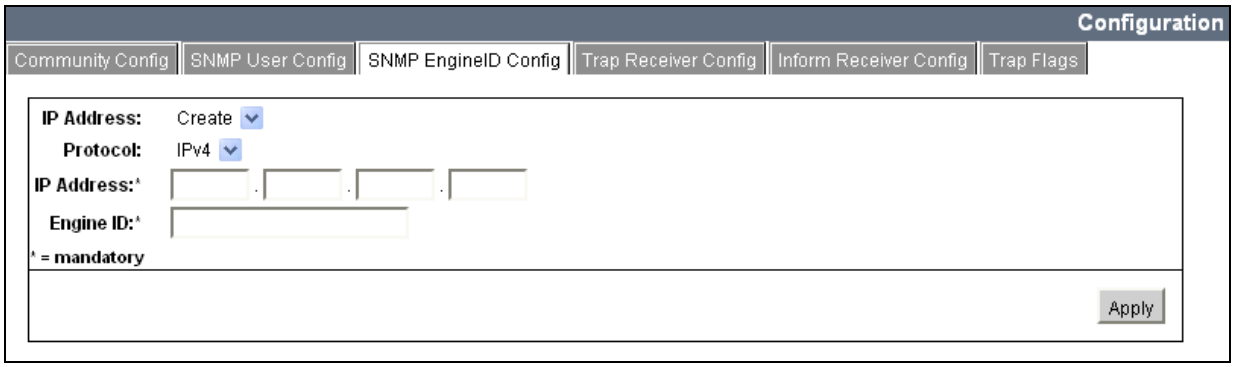

Figure : SNMP EngineID Config

Selection Criteria

Protocol - Select IPv4 or IPv6 to configure the corresponding attributes.

IP Address - You can use this screen to reconfigure an existing host, or to create a new one. Use this pulldown menu to select one of the existing host, or select 'Create' to add a new one.

Configurable Data

IP Address - Enter the IP address of SNMP host which will receive SNMP trap/inform from this switch. Enter 4 numbers between 0 and 255 separated by periods.

Engine ID - Enter new or changed Engine ID for the selected host. The Engine ID are up to 24 hexadecimal characters in length.

Command Buttons

Apply - Update the switch with the values on this screen. If you want the switch to retain the new values across a power cycle, you must perform a save.

Delete - Delete the currently selected SNMP Engine ID. If you want the switch to retain the new values across a power cycle, you must perform a save.

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8.2.8.4 Trap Receiver Config

This menu will display an entry for every active Trap Receiver.

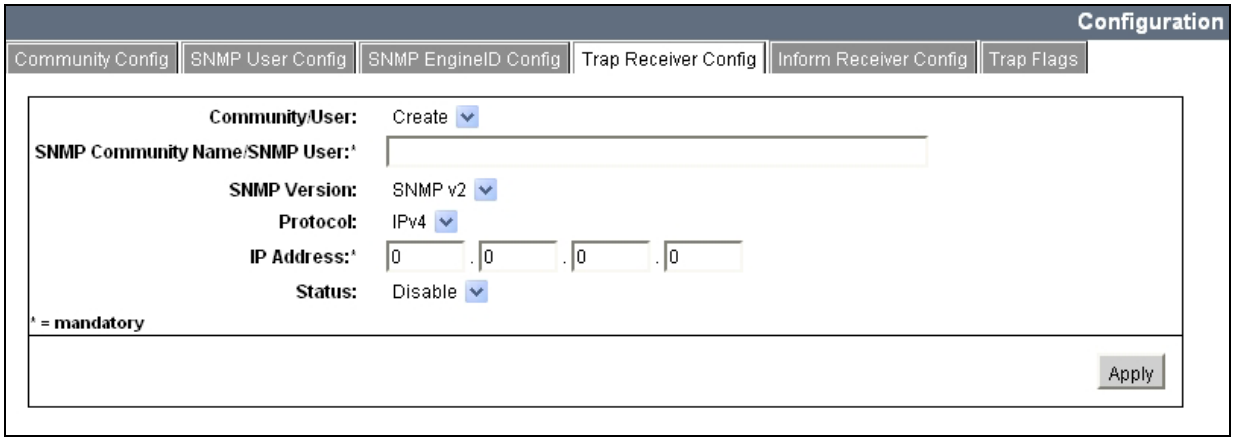

Figure : SNMP Trap Receiver Config

Selection Criteria

Community/User - You can use this screen to reconfigure an existing community or SNMP user, or to create a new one. Use this pulldown menu to select one of the existing community names or SNMP user, or select 'Create' to add a new one. **SNMP Version** - Select the trap version to be used by the receiver from the pull down menu:

- SNMP v1 - Uses SNMP v1 to send traps to the receiver.
- SNMP v2 - Uses SNMP v2 to send traps to the receiver.
- SNMP v3 - Uses SNMP v3 to send traps to the receiver.

Protocol - Select IPv4 or IPv6 to configure the corresponding attributes.

Security Level - Select the SNMP User's security status from the pulldown menu:

- noAuthNoPriv - Authentication Protocol is "None".
- authNoPriv - Authentication Protocol is setting and Encryption Protocol is "None".

authPriv - Both Authentication Protocol and Encryption Protocol is setting.

Status - Select the receiver's status from the pull down menu:

- Enable - Send traps to the receiver
- Disable - Do not send traps to the receiver.

Configurable Data

SNMP Community Name/SNMP User - Enter the community string or SNMP user for the SNMP trap packet to be sent to the trap manager. This may be up to 16 characters and is case sensitive.

IP Address - Enter the IP address to receive SNMP traps from this device. Enter 4 numbers between 0 and 255 separated by periods.

Command Buttons

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Apply - Update the IBP with the values on this screen. If you want the IBP to retain the new values across a power cycle, you must perform a save.

Delete - Delete the currently selected Community Name. If you want the IBP to retain the new values across a power cycle, you must perform a save.

8.2.8.5 Inform Receiver Config

This menu will display an entry for every active SNMP Inform Receiver.

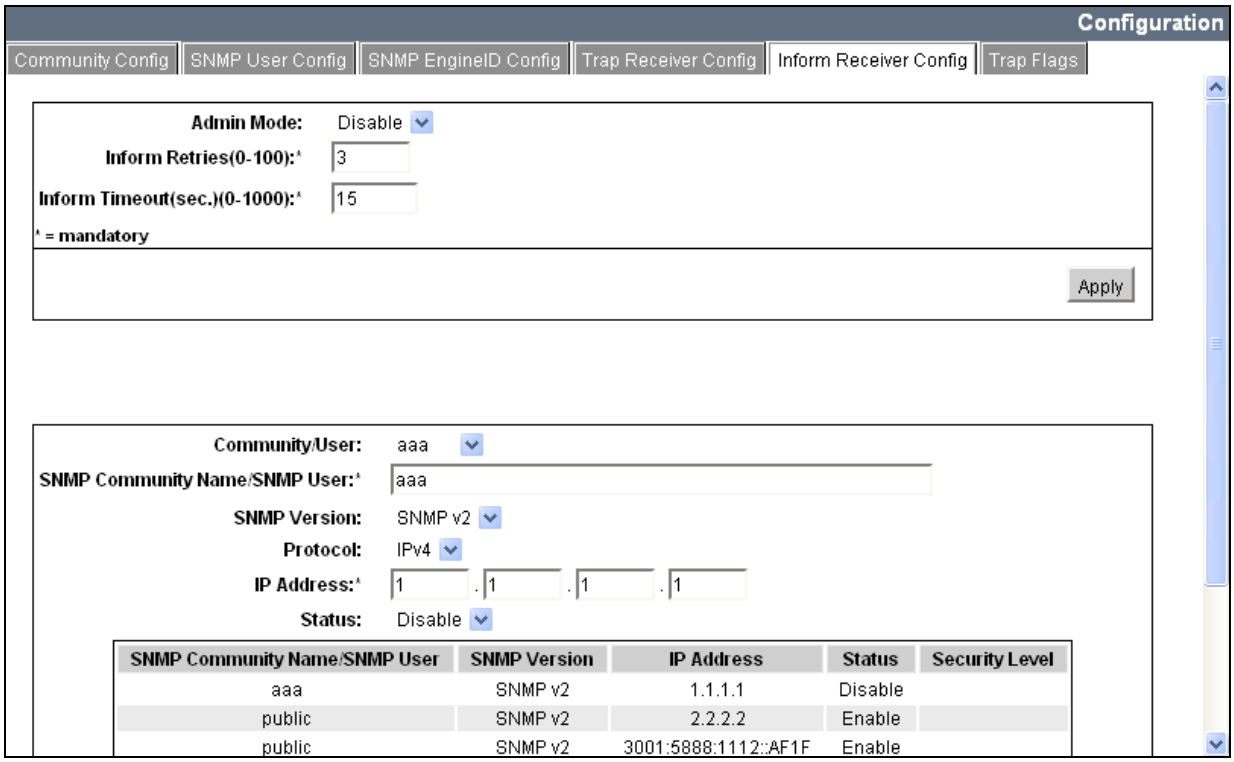

Figure : Inform Recevier Config

Selection Criteria

Admin Mode - You can use this screen to enable or disable the inform function.

Community/User - You can use this screen to reconfigure an existing community or SNMP user, or to create a new one. Use this pulldown menu to select one of the existing community names or SNMP user, or select 'Create' to add a new one.

SNMP Version - Select the inform version to be used by the receiver from the pull down menu:

SNMP v2 - Uses SNMP v2 to send informs to the receiver.

SNMP v3 - Uses SNMP v3 to send informs to the receiver.

Protocol - Select IPv4 or IPv6 to configure the corresponding attributes.

Security Level - Select the SNMP User's security status from the pulldown menu:

- noAuthNoPriv - Authentication Protocol is "None".
- authNoPriv - Authentication Protocol is setting and Encryption Protocol is "None".
- authPriv - Both Authentication Protocol and Encryption Protocol is setting.

Status - Select the receiver's status from the pulldown menu:

Enable - Send informs to the receiver

Disable - Do not send informs to the receiver.

Configurable Data

Inform Retries - Specify how many times to resend the inform. The valid retry value is 0 to 100. Default retry value is 3 times.

Inform Timeout - Specify how many seconds does the switch to wait for the inform ACK. If the inform ACK is not received within the configured timeout value, switch will resend the infrom according to the retry setting. The valid timeout value is 0 to 1000 seconds. Default timeout value is 15 seconds.

SNMP Community Name/SNMP User - Enter the community string or SNMP user for the SNMP inform packet to be sent to the trap manager. This may be up to 16 characters and is case sensitive.

IP Address - Enter the IP address to receive SNMP inform from this device. Enter 4 numbers between 0 and 255 separated by periods.

Command Buttons

Apply - Update the switch with the values on this screen. If you want the switch to retain the new values across a power cycle, you must perform a save.

Delete - Delete the currently selected Community Name. If you want the switch to retain the new values across a power cycle, you must perform a save.

8.2.8.6 Trap Flags

Use this menu to specify which traps you want to enable. When the condition identified by an active trap is encountered by the IBP a trap message will be sent to any enabled SNMP Trap Receivers, and a message will be written to the trap log.

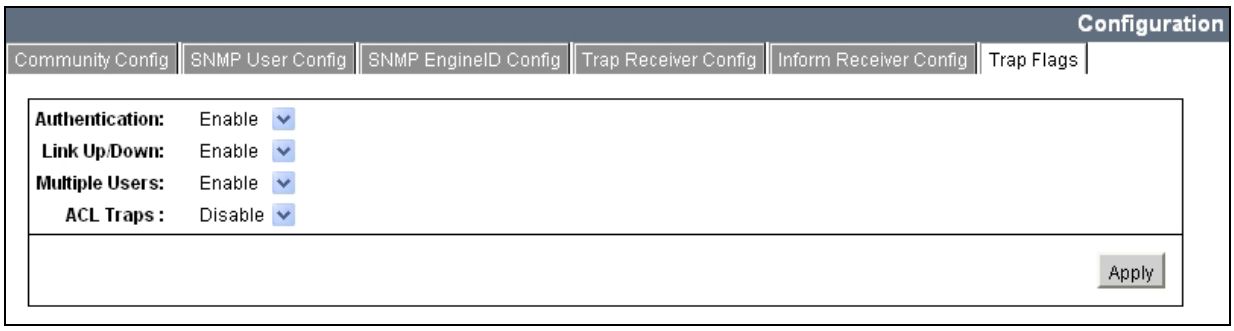

Figure : SNMP Trap Flags

Selection Criteria

Authentication - Enable or disable activation of authentication failure traps by selecting the corresponding line on the pull down entry field. The factory default is enabled.

Link Up/Down - Enable or disable activation of link status traps by selecting the corresponding line on the pull down entry field. The factory default is enabled.

Multiple Users - Enable or disable activation of multiple user traps by selecting the corresponding line on the pull down entry field. The factory default is enabled. This trap is triggered when the same user ID is logged into the IBP more than once at the same time (either via telnet or the serial port).

ACL Traps - Enable or disable activation of ACL traps by selecting the corresponding line on the pull down entry field. The factory default is disabled.

Command Buttons

Apply - Send the updated screen to the IBP and cause the changes to take effect on the IBP. These changes will not be retained across a power cycle unless a save is performed.

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8.2.8.7 Trap Log

This screen lists the entries in the trap log. The information can be retrieved as a file by using System Utilities, Upload File from IBP.

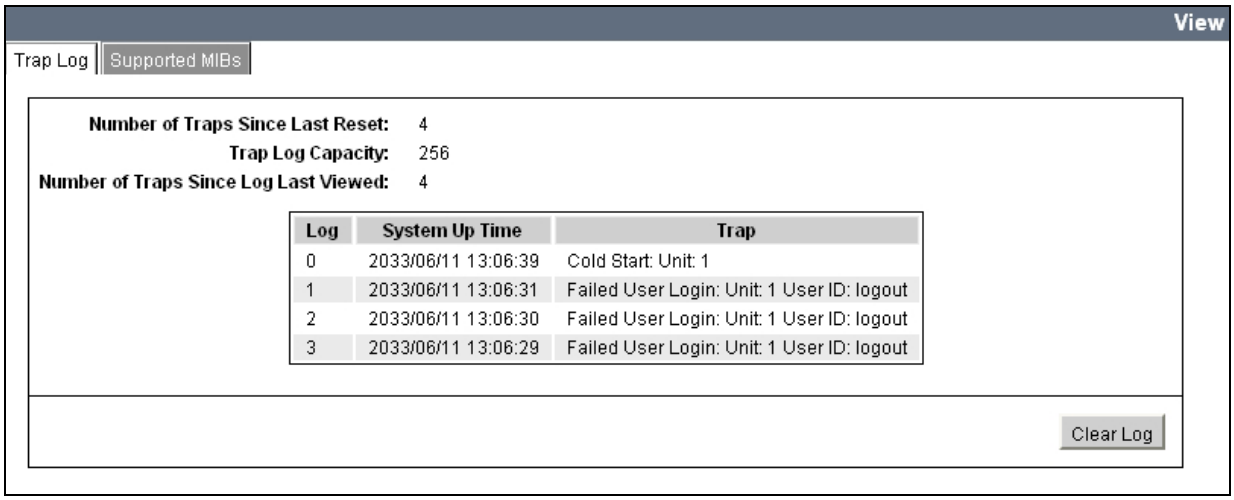


Figure : SNMP Trap Log

Non-Configurable Data

Number of Traps Since Last Reset - The number of traps generated since the trap log entries were last cleared.

Trap Log Capacity - The maximum number of traps stored in the log. If the number of traps exceeds the capacity, the entries will overwrite the oldest entries.

Number of Traps since log last viewed - The number of traps that have occurred since the traps were last displayed. Displaying the traps by any method (terminal interface display, Web display, upload file from IBP etc.) will cause this counter to be cleared to 0.

Log - The sequence number of this trap.

System Up Time - The time at which this trap occurred, expressed in days, hours, minutes and seconds since the last reboot of the IBP.

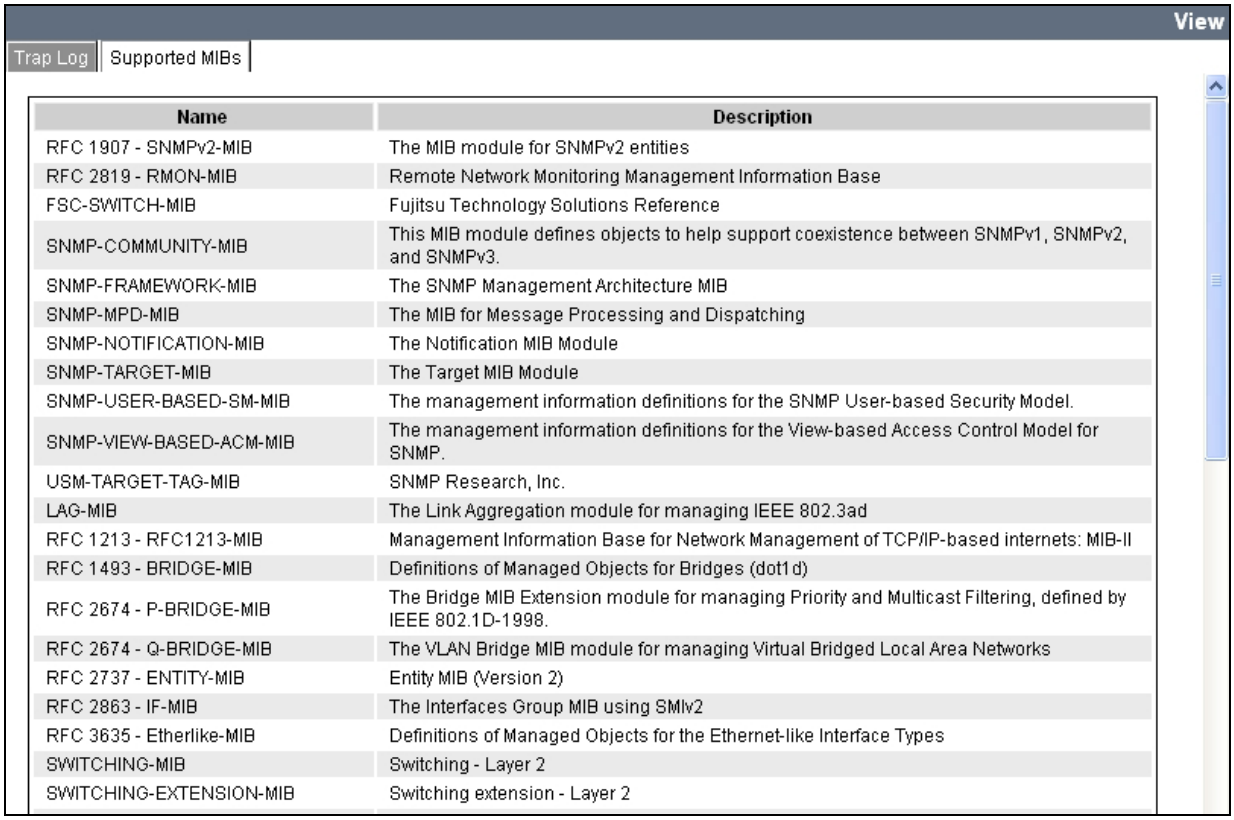
Trap - Information identifying the trap.

Command Buttons

Clear Log - Clear all entries in the log. Subsequent displays of the log will only show new log entries.

8.2.8.8 Supported MIBs

This is a list of all the MIBs supported by the IBP.



Name	Description
RFC 1907 - SNMPv2-MIB	The MIB module for SNMPv2 entities
RFC 2819 - RMON-MIB	Remote Network Monitoring Management Information Base
FSC-SWITCH-MIB	Fujitsu Technology Solutions Reference
SNMP-COMMUNITY-MIB	This MIB module defines objects to help support coexistence between SNMPv1, SNMPv2, and SNMPv3.
SNMP-FRAMEWORK-MIB	The SNMP Management Architecture MIB
SNMP-MPD-MIB	The MIB for Message Processing and Dispatching
SNMP-NOTIFICATION-MIB	The Notification MIB Module
SNMP-TARGET-MIB	The Target MIB Module
SNMP-USER-BASED-SM-MIB	The management information definitions for the SNMP User-based Security Model.
SNMP-VIEW-BASED-ACM-MIB	The management information definitions for the View-based Access Control Model for SNMP.
USM-TARGET-TAG-MIB	SNMP Research, Inc.
LAG-MIB	The Link Aggregation module for managing IEEE 802.3ad
RFC 1213 - RFC1213-MIB	Management Information Base for Network Management of TCP/IP-based internets: MIB-II
RFC 1493 - BRIDGE-MIB	Definitions of Managed Objects for Bridges (dot1d)
RFC 2674 - P-BRIDGE-MIB	The Bridge MIB Extension module for managing Priority and Multicast Filtering, defined by IEEE 802.1D-1998.
RFC 2674 - Q-BRIDGE-MIB	The VLAN Bridge MIB module for managing Virtual Bridged Local Area Networks
RFC 2737 - ENTITY-MIB	Entity MIB (Version 2)
RFC 2863 - IF-MIB	The Interfaces Group MIB using SMIv2
RFC 3635 - Etherlike-MIB	Definitions of Managed Objects for the Ethernet-like Interface Types
SWITCHING-MIB	Switching - Layer 2
SWITCHING-EXTENSION-MIB	Switching extension - Layer 2

Figure : SNMP Supported MIBs

Non-configurable Data

Name - The RFC number if applicable and the name of the MIB.

Description - The RFC title or MIB description.

Command Buttons

Refresh - Update the data.

8.2.9 SNTP

8.2.9.1 Global Config

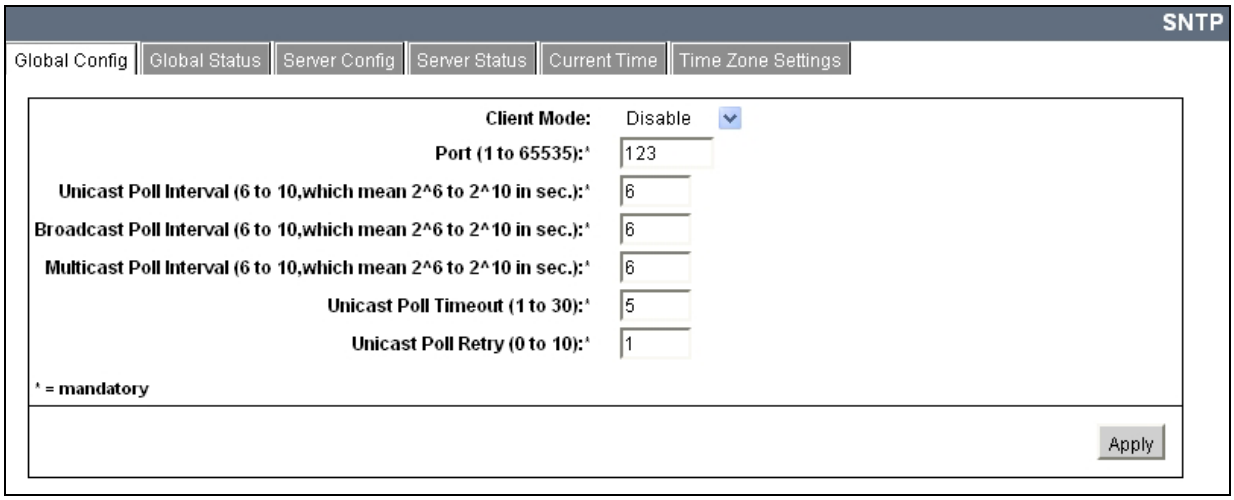


Figure : SNTP Global Config

Selection Criteria

Client Mode - Specifies the mode of operation of SNTP Client. An SNTP client may operate in one of the following modes. Default value is “Disable”.

- ***Disable***- SNTP is not operational. No SNTP requests are sent from the client nor are any received SNTP messages processed.
- ***Unicast***- SNTP operates in a point to point fashion. A unicast client sends a request to a designated server at its unicast address and expects a reply from which it can determine the time and, optionally the round-trip delay and local clock offset relative to the server.
- ***Broadcast*** - SNTP operates in the same manner as multicast mode but uses a local broadcast address instead of a multicast address. The broadcast address has a single subnet scope while a multicast address has Internet wide scope.
- ***Multicast*** - SNTP operates in the Multicast mode. SNTP client wait to receive SNTP server message during Multicast Poll-Interval. The Multicast mode has well know the multicast group address IPv4 224.0.1.1 and IPv6 ff05::101 which be assigned by the IANA.

Configurable Data

Port - Specifies the local UDP port to listen for responses/broadcasts. Allowed range is (1 to 65535). Default value is 123.

Unicast Poll Interval - Specifies the number of seconds between unicast poll requests expressed as a power of two when configured in unicast mode. Allowed range is (6 to 10). Default value is 6.

Broadcast Poll Interval - Specifies the number of seconds between broadcast poll requests expressed as a power of two when configured in broadcast mode. Broadcasts received prior to the expiry of this interval are discarded. Allowed range is (6 to 10). Default value is 6.

Multicast Poll Interval - Specifies the number of seconds between multicast poll requests expressed as a power of two when configured in multicast mode. Multicasts received prior to the expiry of this interval are discarded. Allowed range is (6 to 10) . Default value is 6 .

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Unicast Poll Timeout - Specifies the number of seconds to wait for an SNTP response when configured in unicast mode. Allowed range is (1 to 30). Default value is 5.

Unicast Poll Retry - Specifies the number of times to retry a request to an SNTP server after the first time-out before attempting to use the next configured server when configured in unicast mode. Allowed range is (0 to 10). Default value is 1.

Command Buttons

Apply - Sends the updated configuration to the IBP. Configuration changes take effect immediately.

8.2.9.2 Global Status

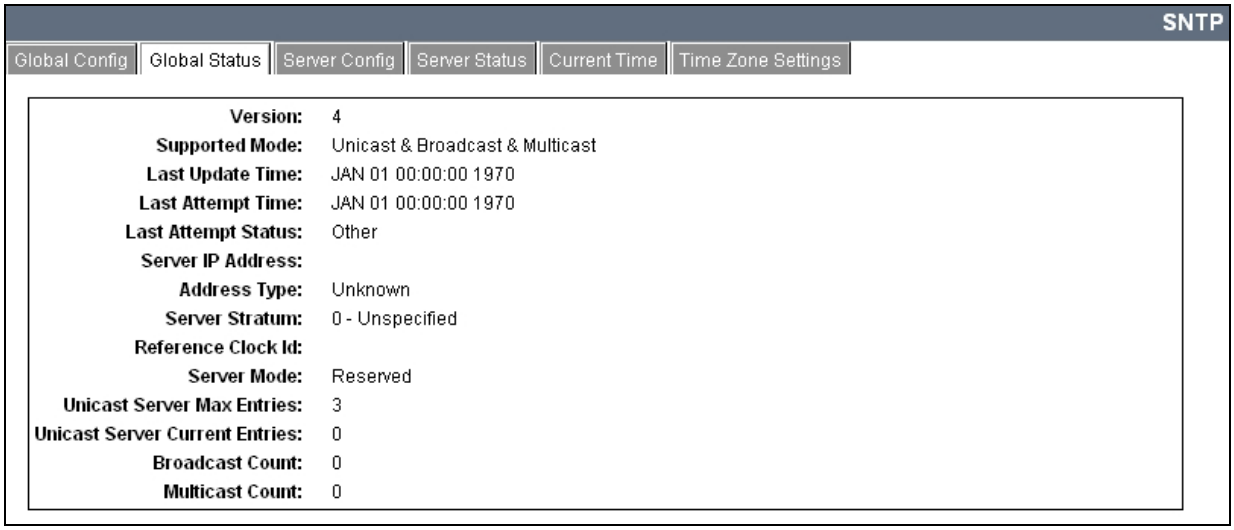

Figure : SNTP Global Status

Non-Configurable Data

Version - Specifies the SNTP Version the client supports.

Supported Mode - Specifies the SNTP modes the client supports. Multiple modes may be supported by a client.

Last Update Time - Specifies the local date and time (UTC) the SNTP client last updated the system clock.

Last Attempt Time - Specifies the local date and time (UTC) of the last SNTP request or receipt of an unsolicited message.

Last Attempt Status - Specifies the status of the last SNTP request or unsolicited message for both unicast and broadcast modes. If no message has been received from a server, a status of Other is displayed. These values are appropriate for all operational modes.

- ***Other*** - None of the following enumeration values.
- ***Success*** - The SNTP operation was successful and the system time was updated.
- ***Request Timed Out*** - A directed SNTP request timed out without receiving a response from the SNTP server.
- ***Bad Date Encoded*** - The time provided by the SNTP server is not valid.
- ***Version Not Supported*** – The SNTP version supported by the server is not compatible with the version supported by the client.
- ***Server Unsynchronized*** - The SNTP server is not synchronized with its peers. This is indicated via the 'leap indicator' field on the SNTP message.
- ***Server Kiss Of Death*** - The SNTP server indicated that no further queries were to be sent to this server. This is indicated by a stratum field equal to 0 in a message received from a server.

Server IP Address - Specifies the IP address of the server for the last received valid packet. If no message has been received from any server, an empty string is shown.

Address Type - Specifies the address type of the SNTP Server address for the last received valid packet.

Server Stratum - Specifies the claimed stratum of the server for the last received valid packet.

Reference Clock Id - Specifies the reference clock identifier of the server for the last received valid packet.

Server Mode - Specifies the mode of the server for the last received valid packet.

Unicast Sever Max Entries - Specifies the maximum number of unicast server entries that can be configured on this client.

Unicast Server Current Entries - Specifies the number of current valid unicast server entries configured for this client.

Broadcast Count - Specifies the number of unsolicited broadcast SNTP messages that have been received and processed by the SNTP client since last reboot.

Multicast Count - Specifies the number of unsolicited multicast SNTP messages that have been received and processed by the SNTP client since last reboot.

8.2.9.3 Server Config

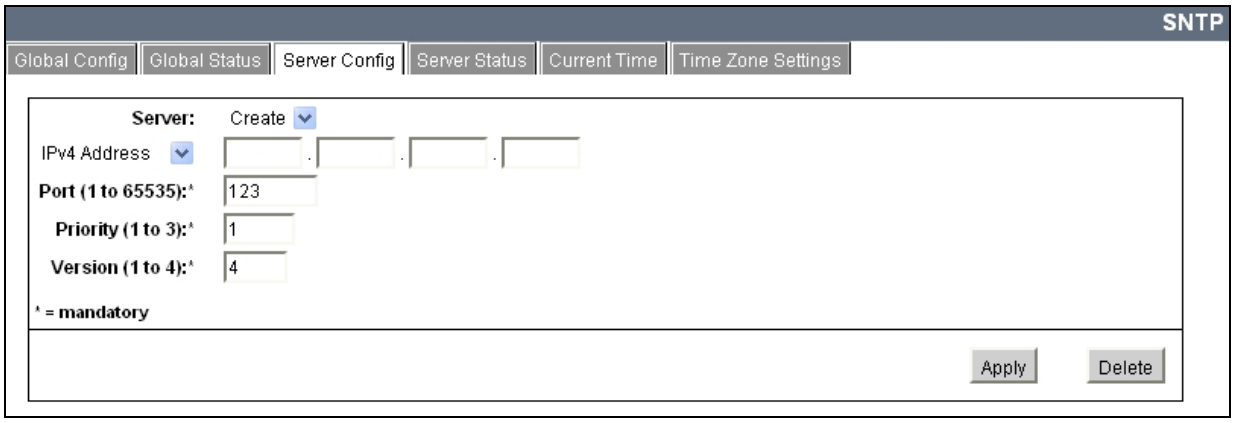

Figure : SNTP Server Config

Selection Criteria

Server - Specifies all the existing Server Addresses along with an additional option "Create". When the user selects "Create" another text box "Address" appears where the user may enter Address for Server to be configured.

Address Type - Specifies the address type of the configured SNTP Server address. Allowed type is :

- IPv4 Address
- Host Name
- Host Name V6
- IPv6 Address

Configurable Data

Address - Specifies the address of the SNTP server. This is a text string of up to 64 characters containing the encoded unicast IP address or hostname of a SNTP server. Unicast SNTP requests will be sent to this address. If this address is a DNS hostname, then that hostname should be resolved into an IP address each time a SNTP request is sent to it.

Port - Specifies the port on the server to which SNTP requests are to be sent. Allowed range is (1 to 65535). Default value is 123.

Priority - Specifies the priority of this server entry in determining the sequence of servers to which SNTP requests will be sent. The client continues sending requests to different servers until a successful response is received or all servers are exhausted. This object indicates the order in which to query the servers. A server entry with a precedence of 1 will be queried before a server with a priority of 2, and so forth. If more than one server has the same priority then the requesting order will follow the lexicographical ordering of the entries in this table. Allowed range is (1 to 3). Default value is 1.

Version - Specifies the NTP Version running on the server. Allowed range is (1 to 4). Default value is 4.

Command Buttons

Apply - Sends the updated configuration to the IBP. Configuration changes take effect immediately.

Delete - Deletes the SNTP Server entry. Sends the updated configuration to the IBP. Configuration changes take effect immediately.

8.2.9.4 Server Status

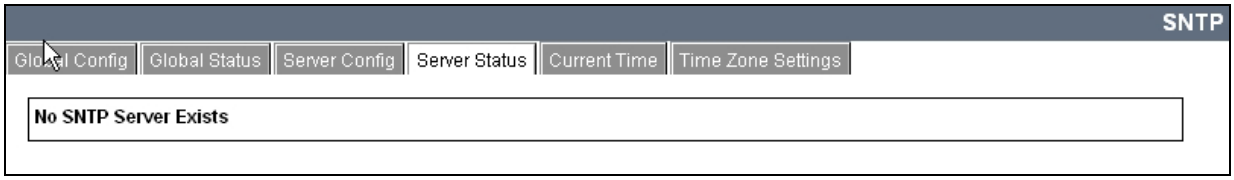

Figure : SNTP Server Status

Non-Configurable Data

Address - Specifies all the existing Server Addresses. If no Server configuration exists, a message saying "No SNTP server exists" flashes on the screen.

Last Update Time - Specifies the local date and time (UTC) that the response from this server was used to update the system clock.

Last Attempt Time - Specifies the local date and time (UTC) that this SNTP server was last queried.

Last Attempt Status - Specifies the status of the last SNTP request to this server. If no packet has been received from this server, a status of Other is displayed.

- ***Other*** - None of the following enumeration values.
- ***Success*** - The SNTP operation was successful and the system time was updated.
- ***Request Timed Out*** - A directed SNTP request timed out without receiving a response from the SNTP server.
- ***Bad Date Encoded*** - The time provided by the SNTP server is not valid.
- ***Version Not Supported*** – The SNTP version supported by the server is not compatible with the version supported by the client.
- ***Server Unsynchronized*** - The SNTP server is not synchronized with its peers. This is indicated via the 'leap indicator' field on the SNTP message.
- ***Server Kiss Of Death*** - The SNTP server indicated that no further queries were to be sent to this server. This is indicated by a stratum field equal to 0 in a message received from a server.

Unicast Server Num Requests - Specifies the number of SNTP requests made to this server since last agent reboot.

Unicast Server Num Failed Requests - Specifies the number of failed SNTP requests made to this server since last reboot.

8.2.9.5 Current Time

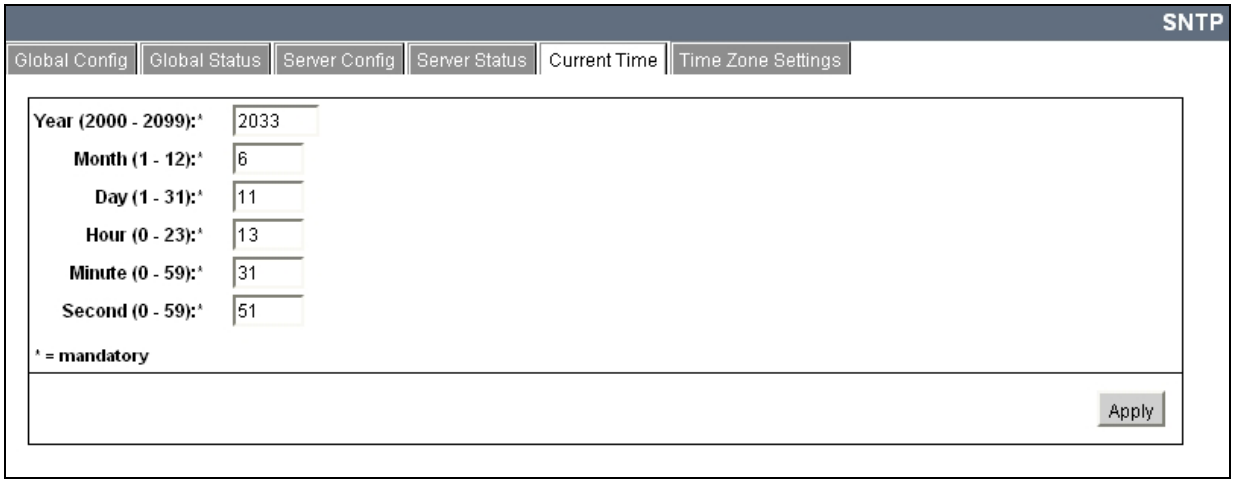

Figure : SNTP Current Time

Configurable Data

Year - Year (4-digit). (Range: 2000 - 2099).

Month - Month. (Range: 1 - 12).

Day - Day of month. (Range: 1 - 31).

Hour - Hour in 24-hour format. (Range: 0 - 23).

Minute - Minute. (Range: 0 - 59).

Second - Second. (Range: 0 - 59).

Command Buttons

Apply - Send the updated screen to the IBP. Changes take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

8.2.9.6 Time Zone Settings

Simple Network Time Protocol (SNTP) allows the IBP to set its internal clock based on periodic updates from a time server. Maintaining an accurate time on the IBP enables the system log to record meaningful dates and times for event entries. You can also manually set the clock using the CLI. If the clock is not set, the IBP will only record the time from the factory default set at the last bootup.

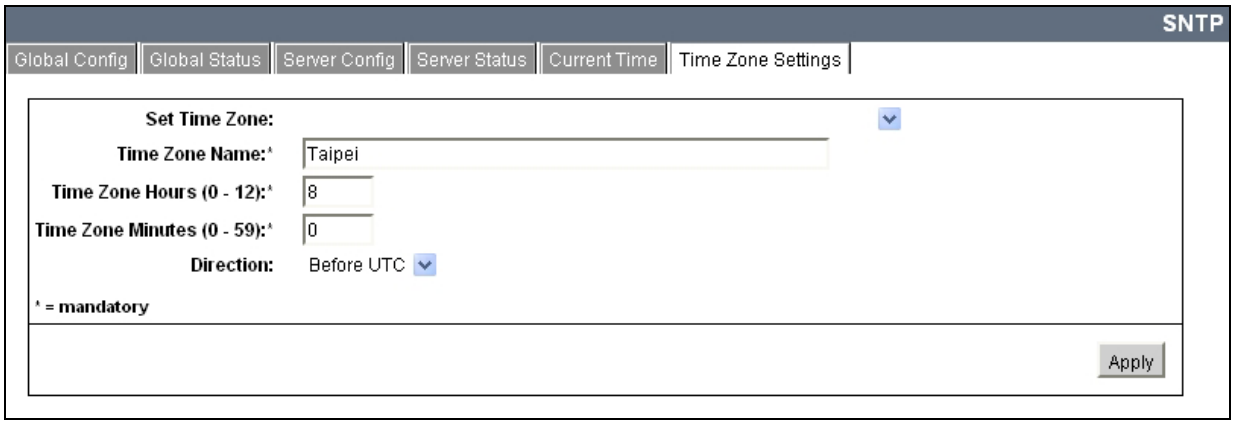

Figure : SNTP Time Zone Settings

Selection Criteria

Direction

- before-utc - Sets the local time zone before (east) of UTC
- after-utc - Sets the local time zone after (west) of UTC

Configurable Data

Time Zone Name - The name of time zone, usually an acronym. (Range: 1-15 characters).

Time Zone Hours - The number of hours before/after UTC. (Range: 0-12 hours).

Time Zone Minutes - The number of minutes before/after UTC. (Range: 0-59 minutes).

Command Buttons

Apply - Send the updated screen to the IBP. Changes take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

8.2.10 UDLD

8.2.10.1 UDLD Config

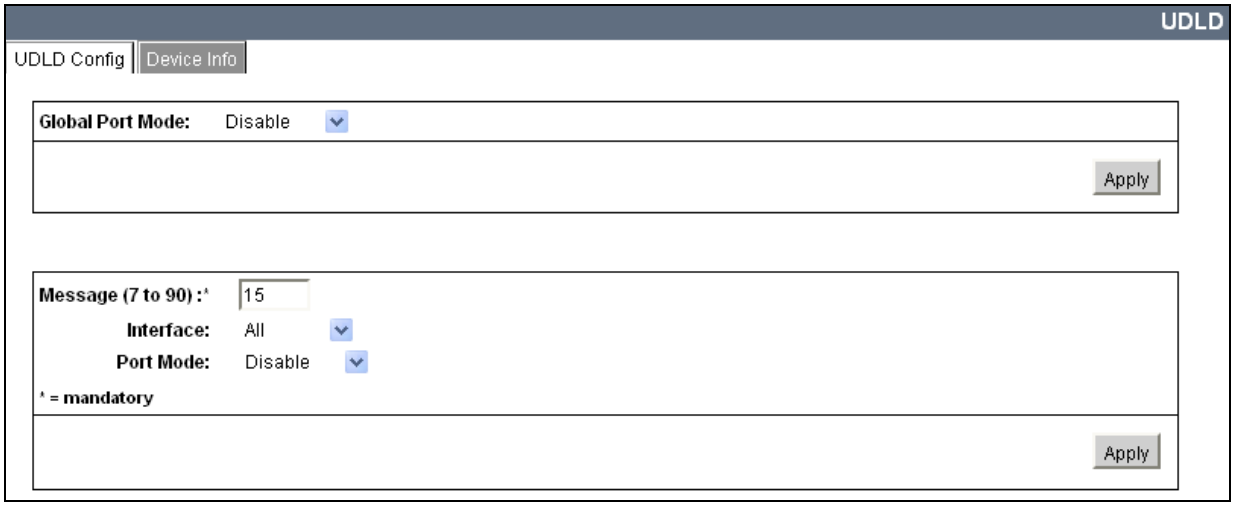

Figure : UDLD Config

Selection Criteria

Global Port Mode - Specifies the UDLD Global Port mode. It has three options : Disable, Normal and Aggressive.

Interface - Specifies the list of all the physical ports on which UDLD can be configured.

Port Mode - Specifies the UDLD Port mode for the selected interface. It has three options : Disable, Normal and Aggressive.

Configurable Data

Message - Specifies the Message Interval in seconds to send of messages in steday state. The range is from (7 to 90). Default value is 15 seconds.

Command Buttons

Apply - Send the updated screen to the switch and cause the changes to take effect on the switch but these changes will not be retained across a power cycle unless a save is performed.

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8.2.10.2 Device Info

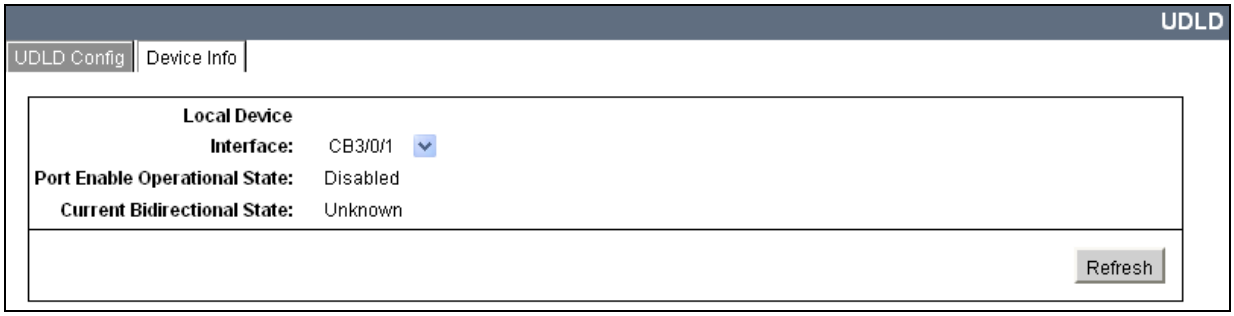

Figure : UDLD Device Info

Selection Criteria

Interface - Specifies the list of all the physical ports on which UDLD can be configured.

Non-Configurable Data

Port Enable Operational State - Specifies the Port Enable Operational State of the selected port.

Current Bidirectional State - Specifies the Bidirectional State of the selected port.

Current Operational State - Specifies the runtime Operational State of the selected port. This section will be hidden if the port doesn't enable udld.

Current Message Interval - Specifies the runtime Message Interval of the selected port. This section will be hidden if the port doesn't enable udld.

Current Timeout Interval - Specifies the runtime Timeout Interval of the selected port. This section will be hidden if the port doesn't enable udld.

Remote Device - Specifies all the remote devices information as following.

Expiration time - Specifies the runtime Expiration Time of the remote entry.

Device ID - Specifies the Device Id associated with the remote system.

Device Name - Specifies the Device Name associated with the remote system.

Port ID - Specifies the Port Id associated with the remote system.

Neighbor echo device - Specifies the Device Id included in Echo TLV associated with the remote system.

Neighbor echo port - Specifies the port Id included in Echo TLV associated with the remote system.

Message interval - Specifies the Message interval associated with the remote system.

Timeout interval - Specifies the Timeout interval associated with the remote system.

Command Buttons

Refresh - Updates the information on the page.

8.2.11 LLDP

8.2.11.1 Global Config

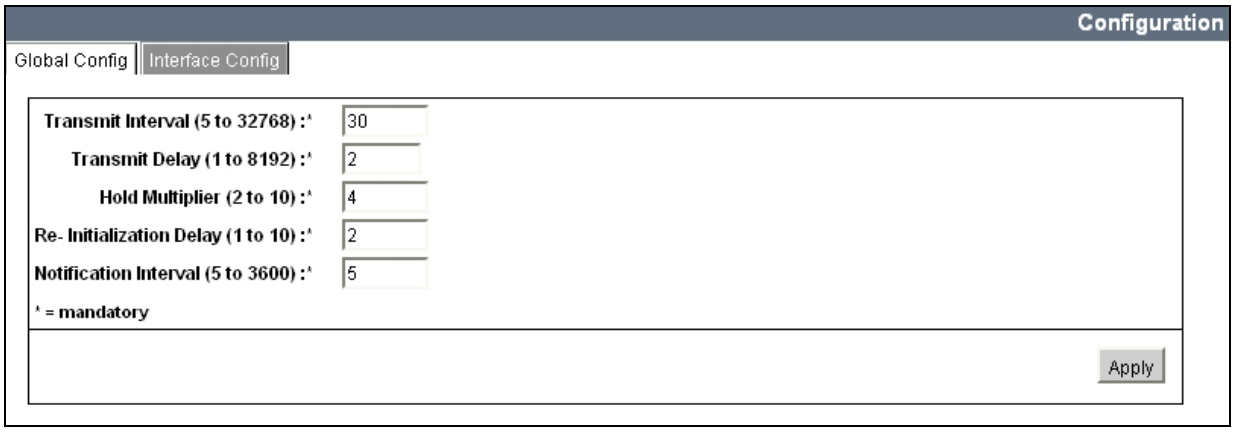

Figure : LLDP Global Config

Configurable Data

Transmit Interval - Specifies the interval in seconds to transmit LLDP frames. The range is from (1 to 32768) . Default value is 30 seconds.

Transmit Delay - Specifies the transmit delay in seconds. The range is from (1 to 8192) . Default value is 2 seconds.

Hold Multiplier - Specifies the multiplier on Transmit Interval to assign TTL. The range is from (2 to 10). Default value is 4.

Re-Initialization Delay - Specifies the delay before re-initialization. The range is from (1 to 10) . Default value is 2 seconds.

Notification Interval - Specifies the interval in seconds for transmission of notifications. The range is from (5 to 3600) . Default value is 5 seconds.

Command Buttons

Apply - Send the updated screen to the IBP and cause the changes to take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

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8.2.11.2 Interface Config

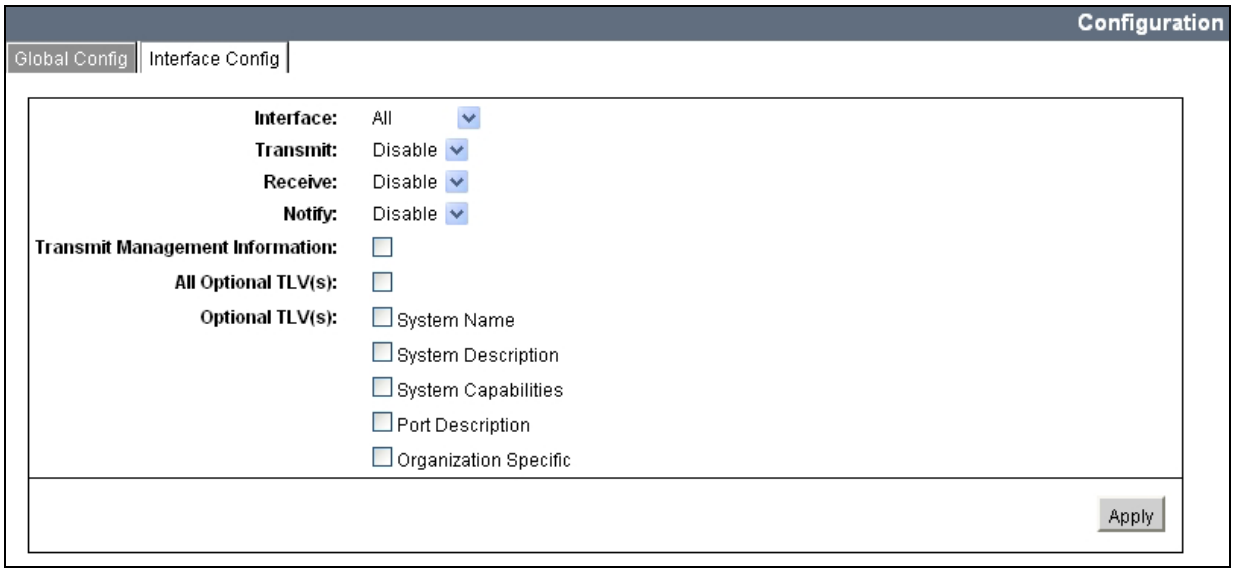

Figure : LLDP Interface Config

Selection Criteria

Interface - Specifies the list of ports on which LLDP - 802.1AB can be configured.

Transmit - Specifies the LLDP - 802.1AB transmit mode for the selected interface.

Receive - Specifies the LLDP - 802.1AB receive mode for the selected interface.

Notify - Specifies the LLDP - 802.1AB notification mode for the selected interface.

Configurable Data

Transmit Management Information - Specifies whether management address is transmitted in LLDP frames for the selected interface.

Optional TLV(s)

- **System Name** - To include system name TLV in LLDP frames.
- **System Description** - To include system description TLV in LLDP frames.
- **System Capabilities** - To include system capability TLV in LLDP frames.
- **Port Description** - To include port description TLV in LLDP frames.
- **Organization Specific** - To include organization specific TLV in LLDP frames.

Command Buttons

Apply - Send the updated screen to the IBP and cause the changes to take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

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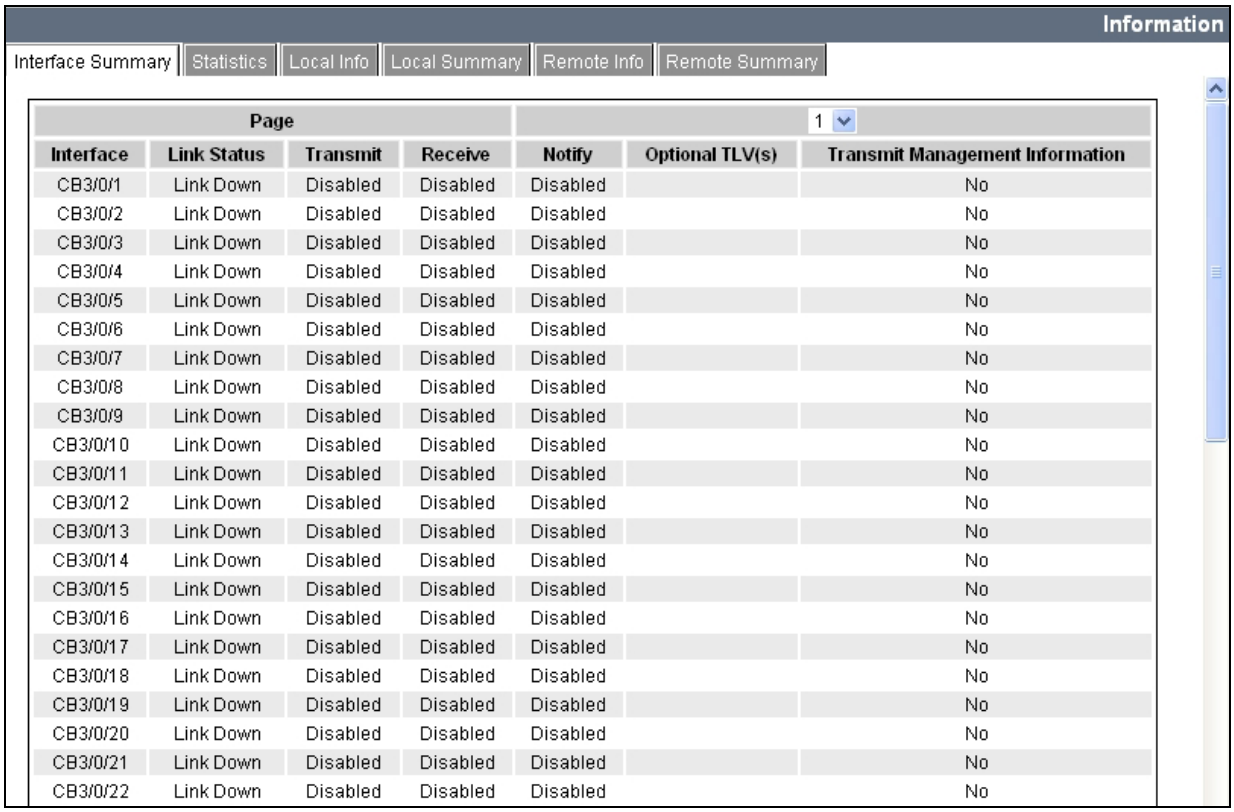
8.2.11.3 Viewing Interface Summary



Interface	Link Status	Transmit	Receive	Notify	Optional TLV(s)	Transmit Management Information
CB3/0/1	Link Down	Disabled	Disabled	Disabled		No
CB3/0/2	Link Down	Disabled	Disabled	Disabled		No
CB3/0/3	Link Down	Disabled	Disabled	Disabled		No
CB3/0/4	Link Down	Disabled	Disabled	Disabled		No
CB3/0/5	Link Down	Disabled	Disabled	Disabled		No
CB3/0/6	Link Down	Disabled	Disabled	Disabled		No
CB3/0/7	Link Down	Disabled	Disabled	Disabled		No
CB3/0/8	Link Down	Disabled	Disabled	Disabled		No
CB3/0/9	Link Down	Disabled	Disabled	Disabled		No
CB3/0/10	Link Down	Disabled	Disabled	Disabled		No
CB3/0/11	Link Down	Disabled	Disabled	Disabled		No
CB3/0/12	Link Down	Disabled	Disabled	Disabled		No
CB3/0/13	Link Down	Disabled	Disabled	Disabled		No
CB3/0/14	Link Down	Disabled	Disabled	Disabled		No
CB3/0/15	Link Down	Disabled	Disabled	Disabled		No
CB3/0/16	Link Down	Disabled	Disabled	Disabled		No
CB3/0/17	Link Down	Disabled	Disabled	Disabled		No
CB3/0/18	Link Down	Disabled	Disabled	Disabled		No
CB3/0/19	Link Down	Disabled	Disabled	Disabled		No
CB3/0/20	Link Down	Disabled	Disabled	Disabled		No
CB3/0/21	Link Down	Disabled	Disabled	Disabled		No
CB3/0/22	Link Down	Disabled	Disabled	Disabled		No

Figure : LLDP Interface Summary

Non-Configurable Data

Interface - Specifies all the ports on which LLDP - 802.1AB can be configured.

Link Status - Specifies the Link Status of the ports whether it is Up/Down.

Transmit - Specifies the LLDP - 802.1AB transmit mode of the interface.

Receive - Specifies the LLDP - 802.1AB receive mode of the interface.

Notify - Specifies the LLDP - 802.1AB notification mode of the interface.

Optional TLV(s) - Specifies the LLDP - 802.1AB optional TLV(s) that are included.

Transmit Management Information - Specifies whether management address is transmitted in LLDP frames.

Command Buttons

Refresh - Updates the information on the page.

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8.2.11.4 Viewing Statistics

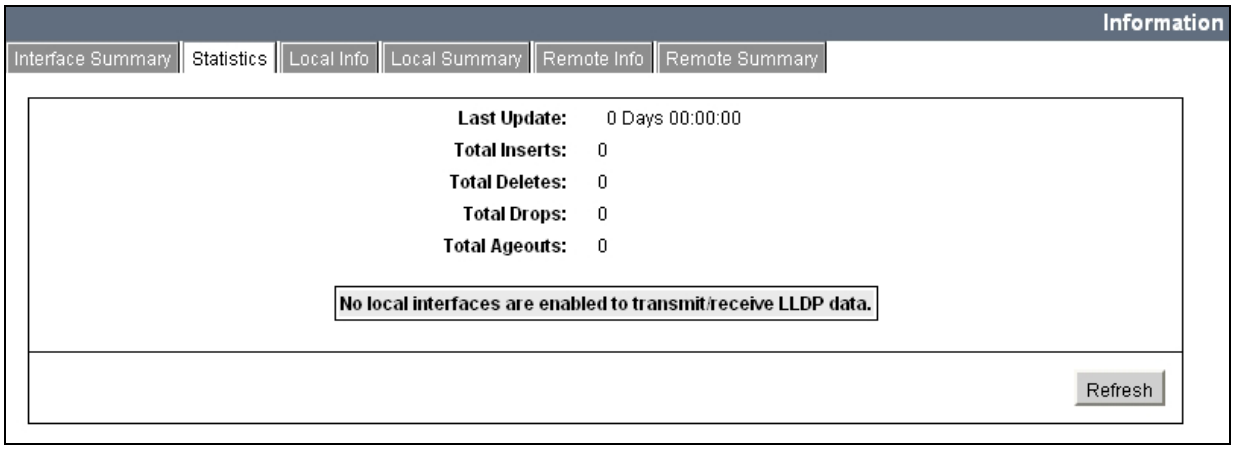

Figure : LLDP Statistics

Non-Configurable Data

Last Update - Specifies the time when an entry was created, modified or deleted in the tables associated with the remote system.

Total Inserts - Specifies the number of times the complete set of information advertised by a particular MAC Service Access Point (MSAP) has been inserted into tables associated with the remote systems.

Total Deletes - Specifies the number of times the complete set of information advertised by a particular MAC Service Access Point (MSAP) has been deleted from tables associated with the remote systems.

Total Drops - Specifies the number of times the complete set of information advertised by a particular MAC Service Access Point (MSAP) could not be entered into tables associated with the remote systems because of insufficient resources.

Total Age outs - Specifies the number of times the complete set of information advertised by a particular MAC Service Access Point (MSAP) has been deleted from tables associated with the remote systems because the information timeliness interval has expired.

Interface - Specifies the Slot/Port for the interfaces.

Transmit Total - Specifies the number of LLDP frames transmitted by the LLDP agent on the corresponding port.

Receive Total - Specifies the number of valid LLDP frames received by this LLDP agent on the corresponding port, while the LLDP agent is enabled.

Discards - Specifies the number of LLDP TLVs discarded for any reason by the LLDP agent on the corresponding port.

Errors - Specifies the number of invalid LLDP frames received by the LLDP agent on the corresponding port, while the LLDP agent is enabled.

Age outs - Specifies the number of age-outs that occurred on a given port. An age-out is the number of times the complete set of information advertised by a particular MAC Service Access Point (MSAP) has been deleted from tables associated with the remote entries because information timeliness interval had expired.

TLV Discards - Specifies the number of LLDP TLVs discarded for any reason by the LLDP agent on the corresponding port.

TLV Unknowns - Specifies the number of LLDP TLVs received on the local ports which were not recognized by the LLDP agent on the corresponding port.

Command Buttons

Refresh - Updates the information on the page.

Clear - Clears LLDP Statistics of all the interfaces.

8.2.11.5 Viewing Local Info

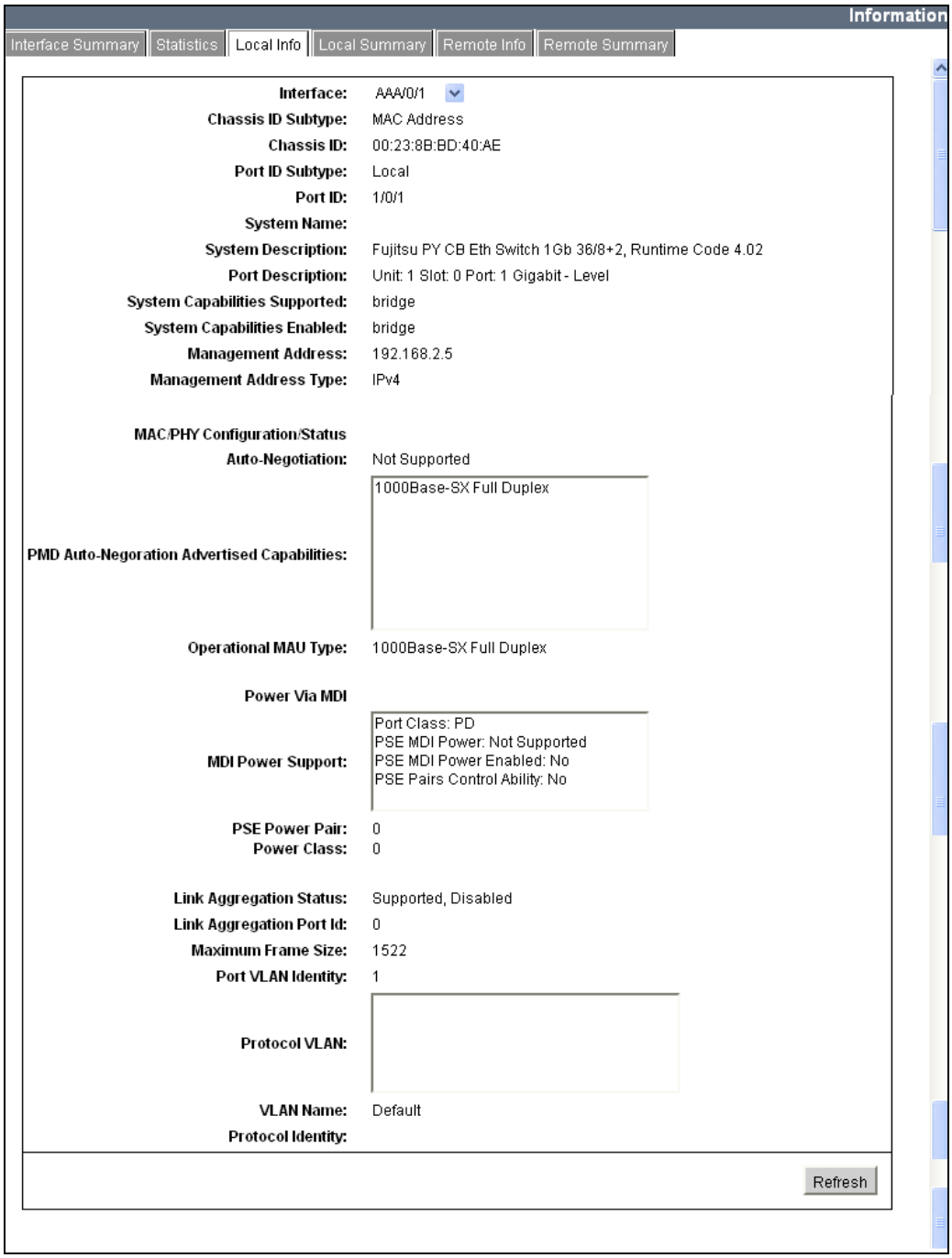

Figure : LLDP Local Info

Selection Criteria

Interface - Specifies the list of all the ports on which LLDP - 802.1AB frames can be transmitted.

Non-Configurable Data

Chassis ID Subtype - Specifies the string that describes the source of the chassis identifier.

Chassis ID - Specifies the string value used to identify the chassis component associated with the local system.

Port ID Subtype - Specifies the string describes the source of the port identifier.

Port ID - Specifies the string that describes the source of the port identifier.

System Name - Specifies the system name of the local system.

System Description - Specifies the description of the selected port associated with the local system.

Port Description - Specifies the description of the selected port associated with the local system.

System Capabilities Supported - Specifies the system capabilities of the local system.

System Capabilities Enabled - Specifies the system capabilities of the local system which are supported and enabled.

Management Address - Specifies the advertised management address of the local system.

Management Address Type - Specifies the type of the management address.

MAC/PHY Configuration/Status

- **Auto-Negotiation** - Specifies whether the auto-negotiation is supported and whether the auto-negotiation is enabled.
- **PMD Auto-Negoration Advertised Capabilities** - Specifies the auto-negotiation and speed capabilities of the PMD.
- **Operational MAU Type** - Specifies the current duplex and speed settings of the sending system.

Power Via MDI

- **MDI Power Support** - Specifies the MDI power support capabilities of the sending IEEE 802.3 LAN station.
- **PSE Power Pair** - Specifies which pair is powered.
- **Power Class** - Specifies the required power level required.

Link Aggregation Status - Specifies the capability and current aggregation status of the link.

Link Aggregation Port Id - Specifies the aggregated port identifier.

Maximum Frame Size - Specifies the maximum supported IEEE 802.3 frame size.

Port VLAN Identity - Specifies the VLAN ID of the port.

Protocol VLAN - Specifies the Protocol VLAN ID and status.

VLAN Name - Specifies the VLAN name.

Protocol Identity - Specifies the particular protocols that are accessible through the port.

Command Buttons

Refresh - Updates the information on the page.

8.2.11.6 Viewing Local Summary

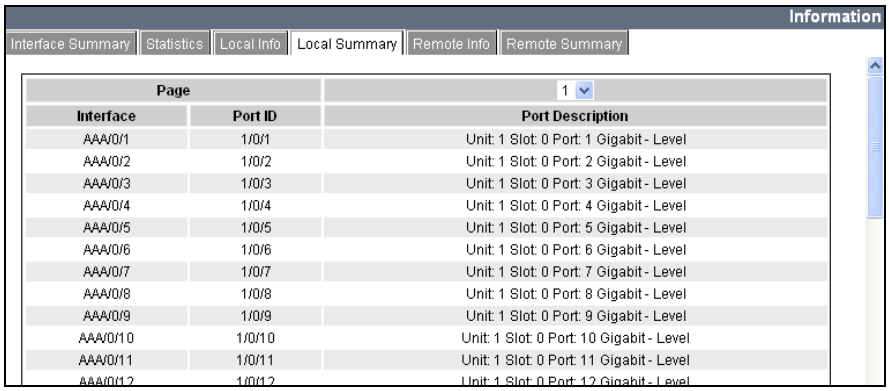
Information
Interface Summary
Statistics
Local Info
Local Summary
Remote Info
Remote Summary
Page
1
Interface
Port ID
Port Description
AAA/0/1 1/0/1 Unit: 1 Slot: 0 Port: 1 Gigabit - Level
AAA/0/2 1/0/2 Unit: 1 Slot: 0 Port: 2 Gigabit - Level
AAA/0/3 1/0/3 Unit: 1 Slot: 0 Port: 3 Gigabit - Level
AAA/0/4 1/0/4 Unit: 1 Slot: 0 Port: 4 Gigabit - Level
AAA/0/5 1/0/5 Unit: 1 Slot: 0 Port: 5 Gigabit - Level
AAA/0/6 1/0/6 Unit: 1 Slot: 0 Port: 6 Gigabit - Level
AAA/0/7 1/0/7 Unit: 1 Slot: 0 Port: 7 Gigabit - Level
AAA/0/8 1/0/8 Unit: 1 Slot: 0 Port: 8 Gigabit - Level
AAA/0/9 1/0/9 Unit: 1 Slot: 0 Port: 9 Gigabit - Level
AAA/0/10 1/0/10 Unit: 1 Slot: 0 Port: 10 Gigabit - Level
AAA/0/11 1/0/11 Unit: 1 Slot: 0 Port: 11 Gigabit - Level

Figure : LLDP Local Summary

Non-Configurable Data

Interface - Specifies the ports on which LLDP - 802.1AB frames can be transmitted.

Port ID - Specifies the string describes the source of the port identifier.

Port Description - Specifies the description of the port associated with the local system.

Command Buttons

Refresh - Updates the information on the page.

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8.2.11.7 Viewing Remote Info

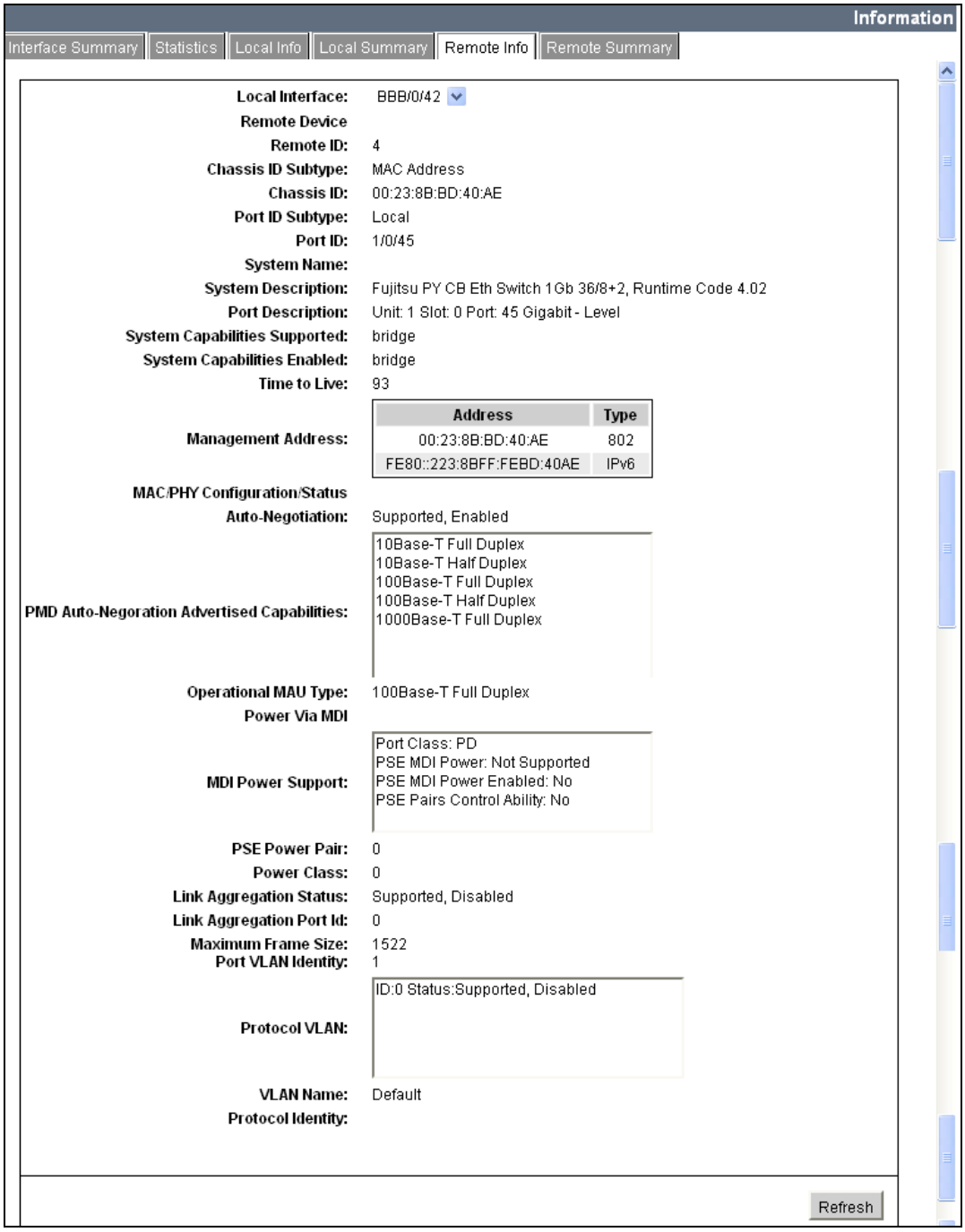

Figure : LLDP Remote Info

Selection Criteria

Local Interface - Specifies all the local ports which can receive LLDP frames.

Non-Configurable Data

Chassis ID Subtype - Specifies the source of the chassis identifier.

Chassis ID - Specifies the chassis component associated with the remote system.

Port ID Subtype - Specifies the source of port identifier.

Port ID - Specifies the port component associated with the remote system.

System Name - Specifies the system name of the remote system.

System Description - Specifies the description of the given port associated with the remote system.

Port Description - Specifies the description of the given port associated with the remote system.

System Capabilities Supported - Specifies the system capabilities of the remote system.

System Capabilities Enabled - Specifies the system capabilities of the remote system which are supported and enabled.

Time to Live - Specifies the Time To Live value in seconds of the received remote entry.

Management Address

- **Management Address** - Specifies the advertised management address of the remote system.
- **Type** - Specifies the type of the management address.

MAC/PHY Configuration/Status

- **Auto-Negotiation** - Specifies whether the auto-negotiation is supported and whether the auto-negotiation is enabled.
- **PMD Auto-Negoration Advertised Capabilities** - Specifies the auto-negotiation and speed capabilities of the PMD.
- **Operational MAU Type** - Specifies the current duplex and speed settings of the sending system.

Power Via MDI

- **MDI Power Support** - Specifies the MDI power support capabilities of the sending IEEE 802.3 LAN station.
- **PSE Power Pair** - Specifies which pair is powered.
- **Power Class** - Specifies the required power level required.

Link Aggregation Status - Specifies the capability and current aggregation status of the link.

Link Aggregation Port Id - Specifies the aggregated port identifier.

Maximum Frame Size - Specifies the maximum supported IEEE 802.3 frame size.

Port VLAN Identity - Specifies the VLAN ID of the port.

Protocol VLAN - Specifies the Protocol VLAN ID and status.

VLAN Name - Specifies the VLAN name.

Protocol Identity - Specifies the particular protocols that are accessible through the port.

Command Buttons

Refresh - Updates the information on the page.

8.2.11.8 Viewing Remote Summary

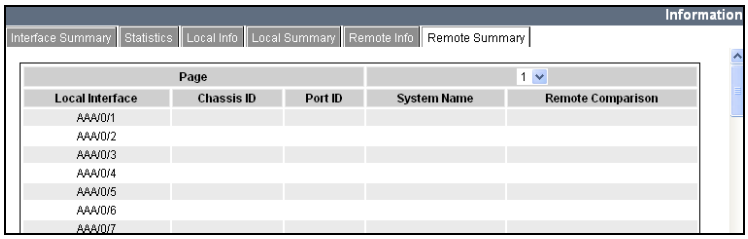

Figure : LLDP Remote Summary

Non-Configurable Data

Local Interface - Specifies the local port which can receive LLDP frames advertised by a remote system.

Chassis ID - Specifies the chassis component associated with the remote system.

Port ID - Specifies the port component associated with the remote system.

System Name - Specifies the system name of the remote system.

Command Buttons

Refresh - Updates the information on the page.

Clear - Clears LLDP Remote Device information received on all the interfaces.

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8.2.12 DHCP Client

8.2.12.1 DHCP Client-Identifier

Specify the DCHP client identifier for the IBP. The DCHP client identifier is used to include a client identifier in all communications with the DHCP server. The identifier type depends on the requirements of your DHCP server.

The DHCP client identifier will be changed immediately on the configuration if the hostname is changed. A renew operation (reboot or "oob protocol none and oob protocol dhcp") is required to activate the new DHCP client identifier.

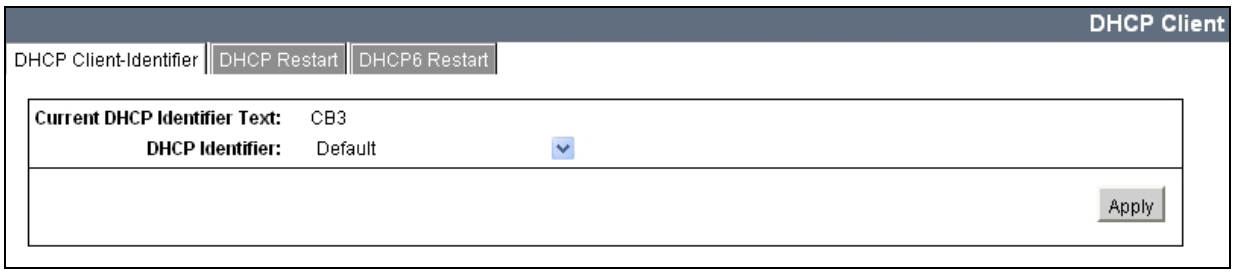

Figure : DHCP Client-Identifier

Selection Criteria

DHCP Identifier - Specifies the type of DHCP Identifier.

- Default
- Specific Text String
- Specific Hexadecimal Value

Non-Configurable Data

Current DHCP Identifier (Hex/Text) - Show the current setting of DHCP identifier.

Configurable Data

Text String - A text string.

Hex Value - The hexadecimal value.

Command Buttons

Apply - Send the updated screen to the IBP perform the setting DHCP client identifier.

8.2.12.2 DHCP Restart

This command issues a BOOTP or DHCP client request for any IP interface that has been set to BOOTP or DHCP mode via the ip address command. DHCP requires the server to reassign the client's last address if available. If the BOOTP or DHCP server has been moved to a different domain, the network portion of the address provided to the client will be based on this new domain.

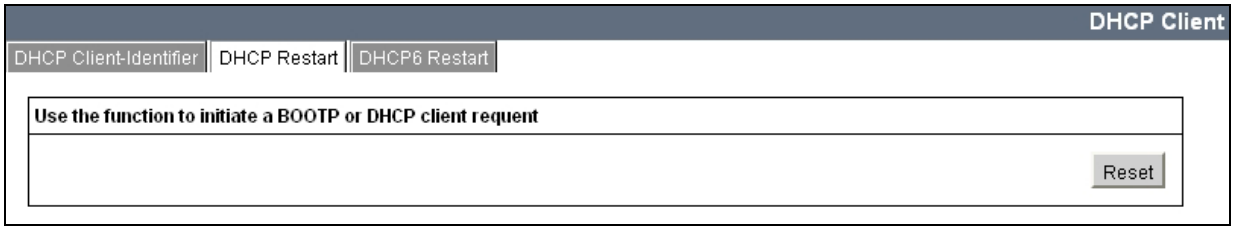

Figure : DHCP Restart

Command Buttons

Reset - Send the updated screen to the IBP perform the restart DHCP client.

8.2.12.3 DHCP6 Restart

This command issues a DHCP6 client request for any IP interface that has been set to DHCP mode via the IP address command. DHCP requires the server to reassign the client's last address if available. If the DHCP server has been moved to a different domain, the network portion of the address provided to the client will be based on this new domain.

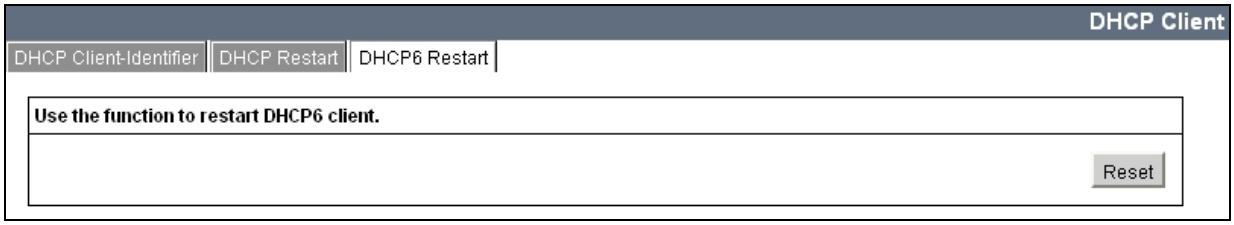

Figure : DHCP6 Restart

Command Buttons

Reset - Send the updated screen to the IBP perform the restart DHCP6 client.

8.2.13 DNS Relay

8.2.13.1 DNS Relay Config

The DNS protocol controls the Domain Name System (DNS), a distributed database with which you can map host names to IPv4/IPv6 addresses. When you configure DNS on your IBP, you can substitute the host name for the IPv4/IPv6 address with all IP commands, such as ping, telnet, traceroute, and related Telnet support operations. To keep track of domain names, IP has defined the concept of a domain name server, which holds a cache (or database) of names mapped to IPv4/IPv6 addresses. To map domain names to IP addresses, you must first identify the host names, specify the name server that is present on your network, and enable the DNS.

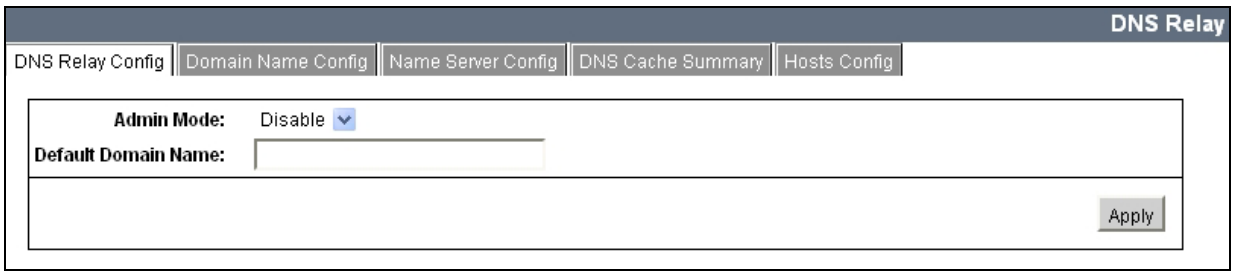

Figure : DNS Relay Config

Selection Criteria

Admin Mode - Select enable or disable from the pull down menu. When you select 'enable', the IP Domain Naming System (DNS)-based host name-to-address translation will be enabled.

Configurable Data

Default Domain Name - Default domain name used to complete unqualified host names. Do not include the initial period that separates an unqualified name from the domain name. This is a text string of up to 63 characters.

Command Buttons

Apply - Send the updated configuration to the IBP. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed

8.2.13.2 Domain Name Config

You can use this screen to change the configuration parameters for the domain names that can be appended to incomplete host names (i.e., host names passed from a client that are not formatted with dotted notation). You can also use this screen to display the contents of the table.

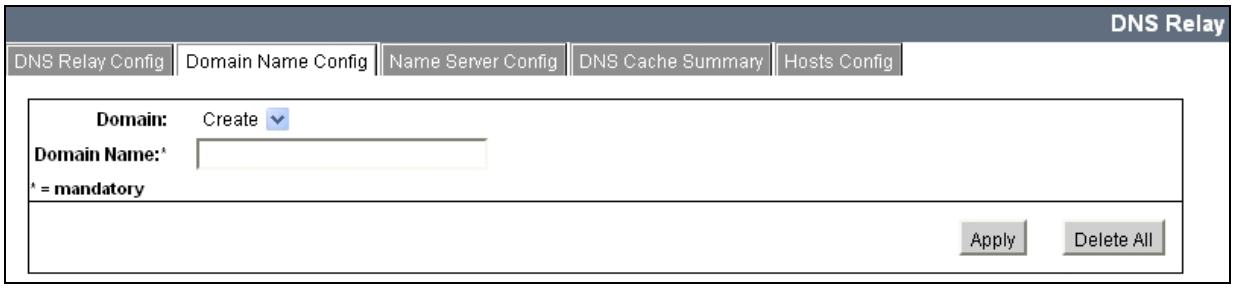

Figure : DNS Relay Domain Name Config

Selection Criteria

Domain - Specifies all the existing domain names along with an additional option "Create". When the user selects "Create" another text box "Domain Name" appears where the user may enter domain name to be configured.

Configurable Data

Domain Name - Specifies the domain name. Do not include the initial period that separates an unqualified name from the domain name. This is a text string of up to 63 characters.

Command Buttons

Apply - Sends the updated configuration to the IBP. Configuration changes take effect immediately.

Delete - Deletes the domain name entry. Sends the updated configuration to the IBP. Configuration changes take effect immediately.

Delete All - Deletes all the domain name entries. Sends the updated configuration to the IBP. Configuration changes take effect immediately.

8.2.13.3 Name Server Config

You can use this screen to change the configuration parameters for the domain name servers. You can also use this screen to display the contents of the table.

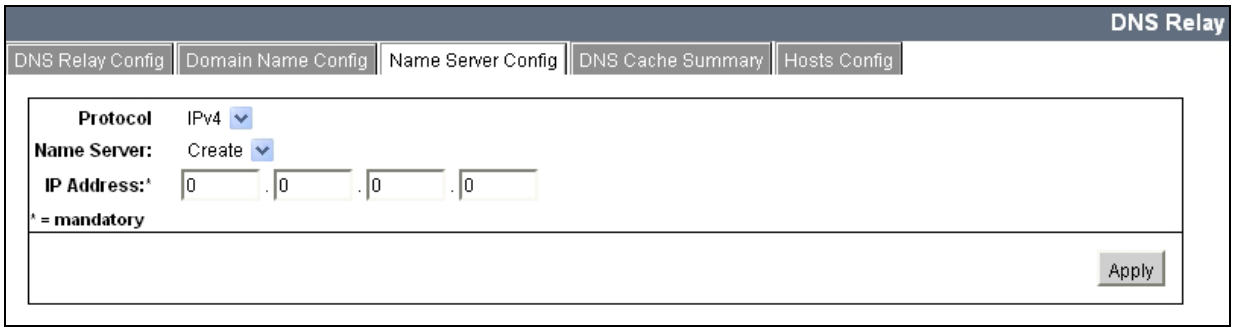

Figure : DNS Relay Name Server Config

Selection Criteria

Protocol – Specify the IP version, IPv4 or IPv6.

Name Server - Specifies all the existing domain name servers along with an additional option "Create". When the user selects "Create" another text box "IP Address" appears where the user may enter domain name server to be configured.

Configurable Data

IP Address - Specifies the IPv4/IPv6 address of the domain name server.

Non-Configurable Data

Request - Specifies the number of DNS requests since last agent reboots.

Response - Specifies the number of DNS Server responses since last agent reboots.

Command Buttons

Apply - Sends the updated configuration to the IBP. Configuration changes take effect immediately.

Delete - Deletes the domain name server entry. Sends the updated configuration to the IBP. Configuration changes take effect immediately.

Delete All - Deletes all the domain name server entries. Sends the updated configuration to the IBP. Configuration changes take effect immediately.

Clear All Counter - Cleans all the name server counters.

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8.2.13.4 DNS Cache Summary

The Domain Name System (DNS) dynamically maps domain name to Internet (IP) addresses. This panel displays the current contents of the DNS cache.

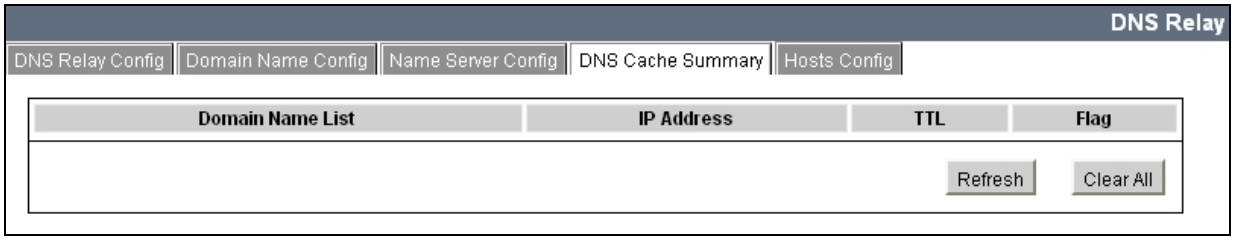

Figure : DNS Cache Summary

Non-Configurable Data

Domain Name List - The domain name associated with this record.

IP address - The IPv4/IPv6 address associated with this record.

TTL - The time to live reported by the name server.

Flag - The flag of the record.

Command Buttons

Refresh - Refresh the page with the latest DNS cache entries.

Clear All - Clear all entries in the DNS cache.

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8.2.13.5 Hosts Config

You can use this screen to change the configuration parameters for the static entry in the DNS table. You can also use this screen to display the contents of the table.

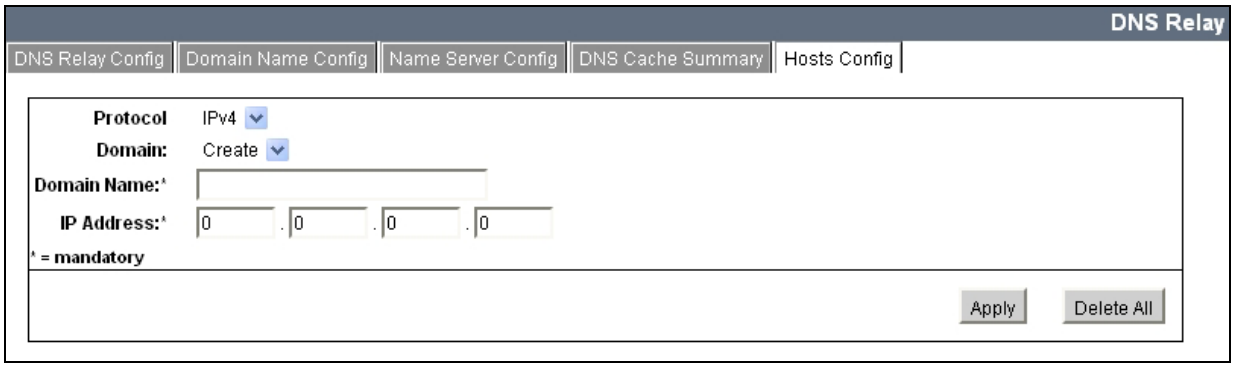

Figure : DNS Relay Hosts Config

Selection Criteria

Protocol – Specify the IP version, IPv4 or IPv6.

Domain - Specifies all the existing hosts along with an additional option "Create". When the user selects "Create" another text box "Domain Name" appears where the user may enter host to be configured.

Configurable Data

Domain Name - Specifies the domain name of the host. This is a text string of up to 63 characters.

IP Address - Specifies the IPv4/IPv6 address of the host.

Command Buttons

Apply - Sends the updated configuration to the IBP. Configuration changes take effect immediately.

Delete - Deletes the host entry. Sends the updated configuration to the IBP. Configuration changes take effect immediately.

Delete All - Deletes all the host entries. Sends the updated configuration to the IBP. Configuration changes take effect immediately.

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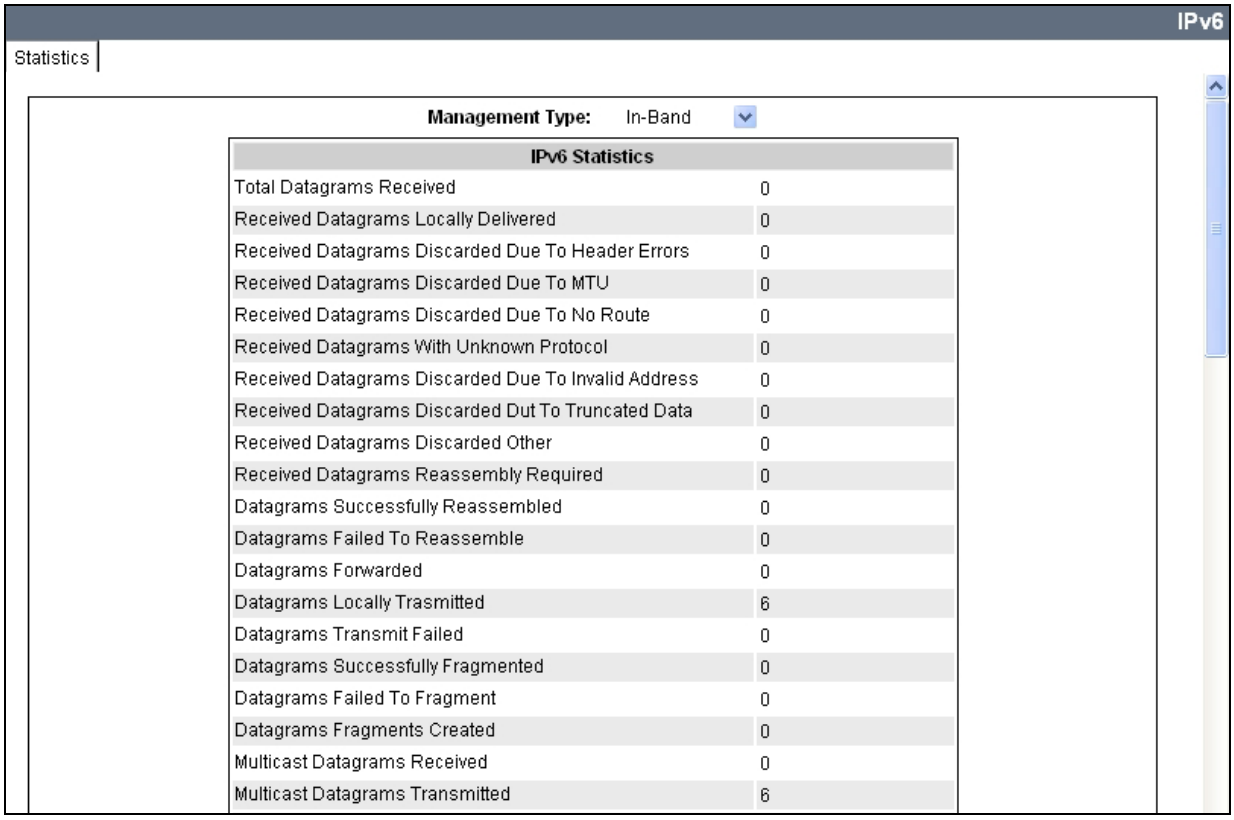
8.2.14 IPv6

8.2.14.1 Statistics



IPv6 Statistics	
Total Datagrams Received	0
Received Datagrams Locally Delivered	0
Received Datagrams Discarded Due To Header Errors	0
Received Datagrams Discarded Due To MTU	0
Received Datagrams Discarded Due To No Route	0
Received Datagrams With Unknown Protocol	0
Received Datagrams Discarded Due To Invalid Address	0
Received Datagrams Discarded Dut To Truncated Data	0
Received Datagrams Discarded Other	0
Received Datagrams Reassembly Required	0
Datagrams Successfully Reassembled	0
Datagrams Failed To Reassemble	0
Datagrams Forwarded	0
Datagrams Locally Trasmitted	6
Datagrams Transmit Failed	0
Datagrams Successfully Fragmented	0
Datagrams Failed To Fragment	0
Datagrams Fragments Created	0
Multicast Datagrams Received	0
Multicast Datagrams Transmitted	6

Figure : IPv6 Statistics

Selection Criteria

Management Type - Selects the port type to be configured. When the selection is changed, a screen refresh will occur causing all fields to be updated for the newly selected port type.

Non-Configurable Data

IPv6 Statistics

Total Datagrams Received - The total number of input datagrams received by the interface, including those received in error.

Received Datagrams Locally Delivered - The total number of datagrams successfully delivered to IPv6 user-protocols (including ICMP). This counter is incremented at the interface to which these datagrams were addressed which might not be necessarily the input interface for some of the datagrams.

Received Datagrams Discarded Due To Header Errors - The number of input datagrams discarded due to errors in their IPv6 headers, including version number mismatch, other format errors, hop count exceeded, errors discovered in processing their IPv6 options, etc.

Received Datagrams Discarded Due To MTU - The number of input datagrams that could not be forwarded because their size exceeded the link MTU of outgoing interface.

Received Datagrams Discarded Due To No Route - The number of input datagrams discarded because no route could be found to transmit them to their destination.

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Received Datagrams With Unknown Protocol - The number of locally-addressed datagrams received successfully but discarded because of an unknown or unsupported protocol. This counter is incremented at the interface to which these datagrams were addressed which might not be necessarily the input interface for some of the datagrams.

Received Datagrams Discarded Due To Invalid Address - The number of input datagrams discarded because the IPv6 address in their IPv6 header's destination field was not a valid address to be received at this entity. This count includes invalid addresses (e.g., ::0) and unsupported addresses(e.g., addresses with unallocated prefixes). For entities which are not IPv6 routers and therefore do not forward datagrams, this counter includes datagrams discarded because the destination address was not a local address.

Received Datagrams Discarded Dut To Truncated Data - The number of input datagrams discarded because datagram frame didn't carry enough data.

Received Datagrams Discarded Other - The number of input IPv6 datagrams for which no problems were encountered to prevent their continued processing, but which were discarded (e.g., for lack of buffer space). Note that this counter does not include any datagrams discarded while awaiting re-assembly.

Received Datagrams Reassembly Required - The number of IPv6 fragments received which needed to be reassembled at this interface. Note that this counter is incremented at the interface to which these fragments were addressed which might not be necessarily the input interface for some of the fragments.

Datagrams Successfully Reassembled - The number of IPv6 datagrams successfully reassembled. Note that this counter is incremented at the interface to which these datagrams were addressed which might not be necessarily the input interface for some of the fragments.

Datagrams Failed To Reassemble - The number of failures detected by the IPv6 reassembly algorithm (for whatever reason: timed out, errors, etc.). Note that this is not necessarily a count of discarded IPv6 fragments since some algorithms (notably the algorithm in RFC 815) can lose track of the number of fragments by combining them as they are received. This counter is incremented at the interface to which these fragments were addressed which might not be necessarily the input interface for some of the fragments.

Datagrams Forwarded - The number of output datagrams which this entity received and forwarded to their final destinations. In entities which do not act as IPv6 routers, this counter will include only those packets which were Source-Routed via this entity, and the Source-Route processing was successful. Note that for a successfully forwarded datagram the counter of the outgoing interface is incremented.

Datagrams Locally Transmitted - The number of datagrams which this entity has successfully transmitted from this output interface.

Datagrams Transmit Failed - The number of datagrams which this entity failed to transmit successfully.

Datagrams Successfully Fragmented - The number of IPv6 datagrams that have been successfully fragmented at this output interface.

Datagrams Failed To Fragment - The number of output datagrams that could not be fragmented at this interface.

Datagrams Fragments Created - The number of output datagram fragments that have been generated as a result of fragmentation at this output interface.

Multicast Datagrams Received - The number of multicast packets received by the interface.

Multicast Datagrams Transmitted - The number of multicast packets transmitted by the interface.

ICMPv6 Statistics

Total ICMPv6 Messages Received - The total number of ICMP messages received by the interface which includes all those counted by ipv6IfIcmpInErrors. Note that this interface is the interface to which the ICMP messages were addressed which may not be necessarily the input interface for the messages.

ICMPv6 Messages With Errors Received - The number of ICMP messages which the interface received but determined as having ICMP-specific errors (bad ICMP checksums, bad length, etc.)

ICMPv6 Destination Unreachable Messages Received - The number of ICMP Destination Unreachable messages received by the interface.

ICMPv6 Messages Prohibited Administratively Received - The number of ICMP destination unreachable/communication administratively prohibited messages received by the interface.

ICMPv6 Time Exceeded Messages Received - The number of ICMP Time Exceeded messages received by the interface.

ICMPv6 Parameter Problem Messages Received - The number of ICMP Parameter Problem messages received by the interface.

ICMPv6 Packet Too Big Messages Received - The number of ICMP Packet Too Big messages received by the interface.

ICMPv6 Echo Request Messages Received - The number of ICMP Echo (request) messages received by the interface.

ICMPv6 Echo Reply Messages Received - The number of ICMP Echo Reply messages received by the interface.

ICMPv6 Router Solicit Messages Received - The number of ICMP Router Solicit messages received by the interface.

ICMPv6 Router Advertisement Messages Received - The number of ICMP Router Advertisement messages received by the interface.

ICMPv6 Neighbor Solicit Messages Received - The number of ICMP Neighbor Solicit messages received by the interface.

ICMPv6 Neighbor Advertisement Messages Received - The number of ICMP Neighbor Advertisement messages received by the interface.

ICMPv6 Redirect Messages Received - The number of ICMPv6 Redirect messaged received by the interface.

ICMPv6 Group Membership Query Messages Received - The number of ICMPv6 Group Membership Query messages received by the interface.

ICMPv6 Group Membership Response Messages Received - The number of ICMPv6 Group Membership Response messages received by the interface.

ICMPv6 Group Membership Reduction Messages Received - The number of ICMPv6 Group Membership Reduction messages received by the interface

Total ICMPv6 Messages Transmitted - The total number of ICMP messages which this interface attempted to send. Note that this counter includes all those counted by icmpOutErrors.

ICMPv6 Messages Not Transmitted Due To Error - The number of ICMP messages which this interface did not send due to problems discovered within ICMP such as a lack of buffers. This value should not include errors discovered outside the ICMP layer such as the inability of IPv6 to route the resultant datagram. In some implementations there may be no types of error which contribute to this counter's value.

ICMPv6 Destination Unreachable Messages Transmitted - The number of ICMP Destination Unreachable Messages sent by the interface.

ICMPv6 Messages Prohibited Administratively Transmitted - Number of ICMP destination unreachable/communication administratively prohibited messages sent.

ICMPv6 Time Exceeded Messages Transmitted - The number of ICMP Time Exceeded messages sent by the interface.

ICMPv6 Parameter Problem Messages Transmitted - The number of ICMP Parameter Problem messages sent by the interface.

ICMPv6 Packet Too Big Messages Transmitted - The number of ICMP Packet Too Big messages sent by the interface.

ICMPv6 Echo Request Messages Transmitted - The number of ICMP Echo (request) messages sent by the interface.

ICMPv6 Echo Reply Messages Transmitted - The number of ICMP Echo Reply messages sent by the interface.

ICMPv6 Router Solicit Messages Transmitted - The number of ICMP Neighbor Solicitation messages sent by the interface.

ICMPv6 Router Advertisement Messages Transmitted - The number of ICMP Router Advertisement messages sent by the interface.

ICMPv6 Neighbor Solicit Messages Transmitted - The number of ICMP Neighbor Solicitation messages sent by the interface.

ICMPv6 Neighbor Advertisement Messages Transmitted - The number of ICMP Neighbor Advertisement messages sent by the interface.

ICMPv6 Redirect Messages Transmitted - The number of Redirect messages sent.

ICMPv6 Group Membership Query Messages Transmitted - The number of ICMPv6 Group Membership Query messages sent.

ICMPv6 Group Membership Response Messages Transmitted - The number of ICMPv6 Group Membership Response messages sent.

ICMPv6 Group Membership Reduction Messages Transmitted - The number of ICMPv6 Group Membership Reduction messages sent.

ICMPv6 Duplicate Address Detects - The number of duplicate addresses detected by the interface.

Command Buttons

Clear - Clear the IPv6 Statistics.

Refresh - Refreshes the screen with most recent data.

8.2.15 sFlow

8.2.15.1 Summary

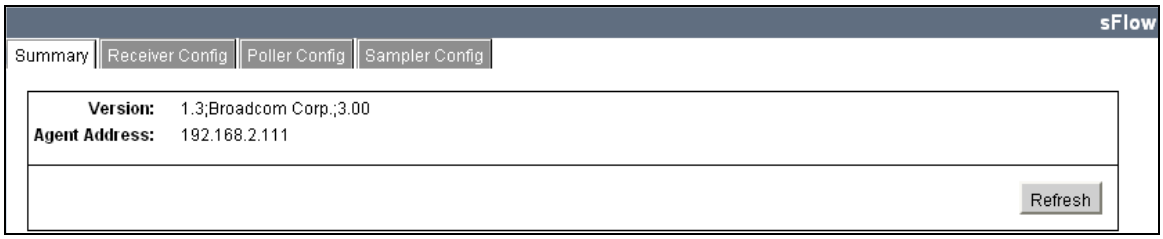

Figure : sFlow Summary

Non-Configurable Data

Version - Uniquely identifies the version and implementation of this MIB. The version string must have the following structure: **MIB Version;Organization;Software**

Revision where:

- MIB Version: '1.3', the version of this MIB.
- Organization: Broadcom Corp.
- Revision: 3.0.

Agent Address - The IP address associated with this agent.

Command Buttons

Refresh - Refresh the data on the screen with present state of data in the switch.

8.2.15.2 Receiver Config

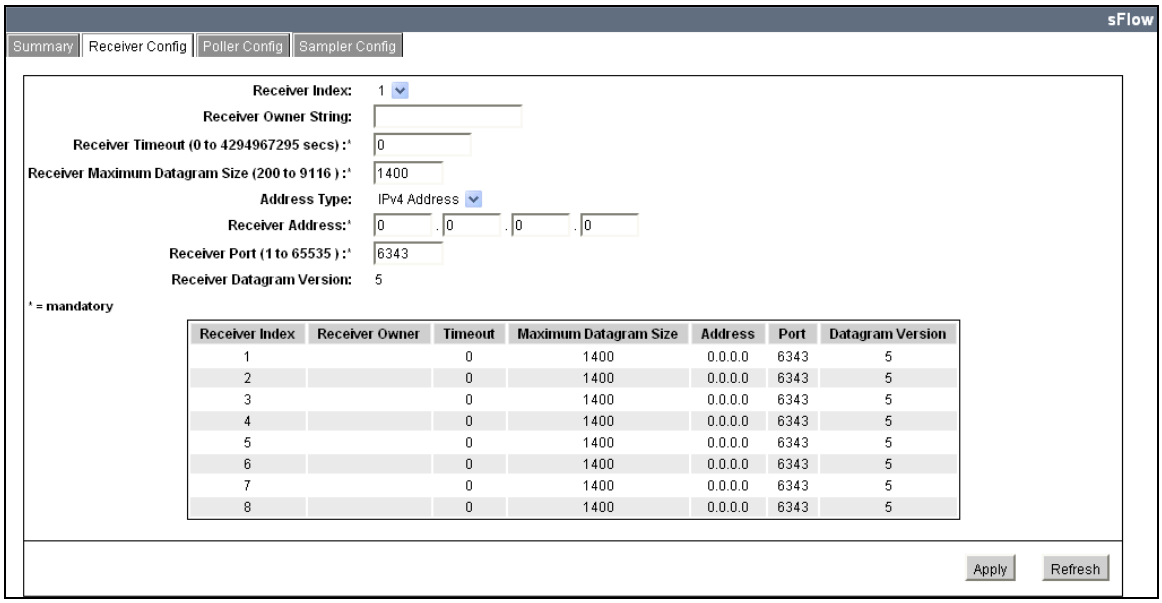
sFlow
Summary
Receiver Config
Poller Config
Sampler Config
Receiver Index: 1
Receiver Owner String:
Receiver Timeout (0 to 4294967295 secs) :*
Receiver Maximum Datagram Size (200 to 9116) :*
Address Type: IPv4 Address
Receiver Address:*
Receiver Port (1 to 65535) :*
Receiver Datagram Version: 5
* = mandatory
Receiver Index | Receiver Owner | Timeout | Maximum Datagram Size | Address | Port | Datagram Version
1 | 0 | 1400 | 0.0.0.0 | 6343 | 5
2 | 0 | 1400 | 0.0.0.0 | 6343 | 5
3 | 0 | 1400 | 0.0.0.0 | 6343 | 5
4 | 0 | 1400 | 0.0.0.0 | 6343 | 5
5 | 0 | 1400 | 0.0.0.0 | 6343 | 5
6 | 0 | 1400 | 0.0.0.0 | 6343 | 5
7 | 0 | 1400 | 0.0.0.0 | 6343 | 5
8 | 0 | 1400 | 0.0.0.0 | 6343 | 5
Apply
Refresh

Figure : sFlow Receiver Config

Selection Criteria

Receiver Index - Selects the receiver for which data is to be displayed or configured. Allowed range is (1 to 8).

Address Type - The type of Receiver Address.(IPv4/IPv6).

Configurable Data

Receiver Owner String - The entity making use of this sFlowRcvrTable entry. The empty string indicates that the entry is currently unclaimed and the receiver configuration is reset to default values. An entity wishing to claim an sFlowRcvrTable entry must ensure that the entry is unclaimed before trying to claim it. The entry is claimed by setting the owner string. The entry must be claimed before any changes can be made to other sampler objects.

Receiver Timeout - The time (in seconds) remaining before the sampler is released and stops sampling. A management entity wanting to maintain control of the sampler is responsible for setting a new value before the old one expires. Allowed range is (0 to 4294967295 secs) A value of zero sets the selected receiver configuration to its default values.

Receiver Maximum Datagram Size - The maximum number of data bytes that can be sent in a single sample datagram. The manager should set this value to avoid fragmentation of the sFlow datagrams. Default Value: 1400. Allowed range is (200 to 9116)

Receiver Address - The IP address of the sFlow collector. If set to 0.0.0.0 no sFlow datagrams will be sent.

Receiver Port - The destination port for sFlow datagrams. Allowed range is (1 to 65535)

Non-Configurable Data

Receiver Owner - The entity making use of this sFlowRcvrTable entry. The empty string indicates that the entry is currently unclaimed.

Timeout - The time (in seconds) remaining before the sampler is released and stops sampling.

Maximum Datagram Size - The maximum number of data bytes that can be sent in a single sample datagram.

Address - The IP address of the sFlow collector.

Port - The destination port for sFlow datagrams.

Datagram Version - The version of sFlow datagrams that should be sent.

Command Buttons

Apply - Send the updated data to the switch and cause the changes to take effect on the switch.

Refresh - Refresh the data on the screen with present state of data in the switch.

8.2.15.3 Poller Config

sFlow agent collects time-based sampling of network interface statistics and sends them to the configured sFlow receivers. A data source configured to collect counter samples is called a poller.

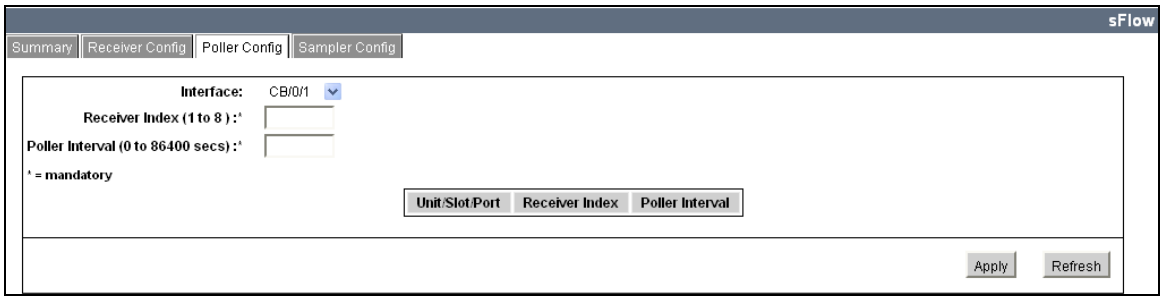

Figure : sFlow Poller Config

Selection Criteria

Interface - sFlowDataSource for this sFlow poller. This Agent will support Physical ports only.

Configurable Data

Receiver Index - The sFlowReceiver associated with this counter poller. Allowed range is (1 to 8).

Poller Interval - The maximum number of seconds between successive samples of the counters associated with this data source. A sampling interval of 0 disables counter sampling. Allowed range is (0 to 86400 secs).

Non-Configurable Data

Receiver Index - The sFlowReceiver for this sFlow Counter Poller. Only active receivers can be set. If a receiver expires then all pollers associated with the receiver will also expire. Allowed range is (1 to 8)

Poller Interval - The maximum number of seconds between successive samples of the counters associated with this data source.

Command Buttons

Apply - Send the updated data to the switch and cause the changes to take effect on the switch.

Delete - Delete the poller data.

Refresh - Refresh the data on the screen with present state of data in the switch.

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8.2.15.4 Sampler Config

sFlow agent collects statistical packet-based sampling of switched flows and sends them to the configured receivers. A data source configured to collect flow samples is called a sampler.

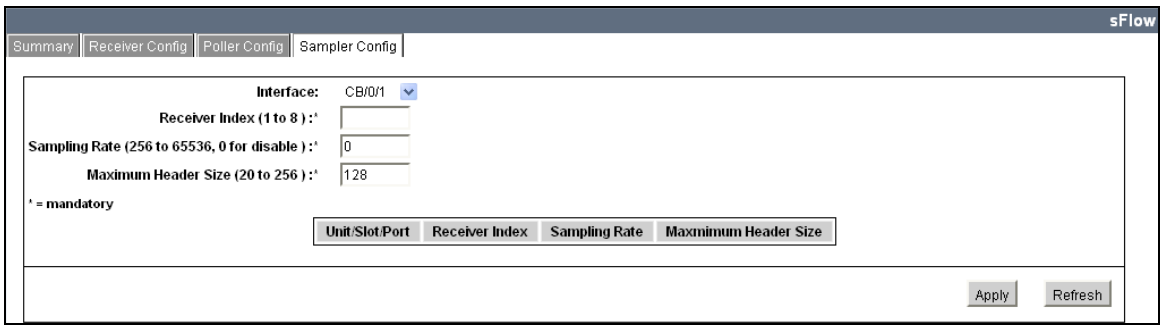

Figure : sFlow Sampler Config

Selection Criteria

Interface - sFlowDataSource for this flow sampler. This Agent will support Physical ports only.

Configurable Data

Receiver Index - The sFlow Receiver for this flow sampler. Only active receivers can be set. If a receiver expires then all samplers associated with the receiver will also expire. Allowed range is (1 to 8)

Sampling Rate - The statistical sampling rate for packet sampling from this source. A sampling rate of 0 disables sampling. Allowed range is (256 to 65536, 0 for disable)

Maximum Header Size - The maximum number of bytes that should be copied from a sampled packet. Allowed range is (20 to 256)

Non-Configurable Data

Receiver Index - The sFlowReceiver for this sFlow sampler.

Sampling Rate - The statistical sampling rate for packet sampling from this source.

Maximum Header Size - The maximum number of bytes that should be copied from a sampled packet.

Command Buttons

Apply - Send the updated data to the switch and cause the changes to take effect on the switch.

Delete - Delete the sampler data.

Refresh - Refresh the data on the screen with present state of data in the switch.

8.3 Group Administration Menu

This section provides users to configure Uplink Set, Port Group, VLAN Port Group, Service LAN, Service VLAN, Port, Port Channel and Port Backup.

8.3.1 Group List

8.3.1.1 Summary

This page displays the summary of all currently configured group of port.

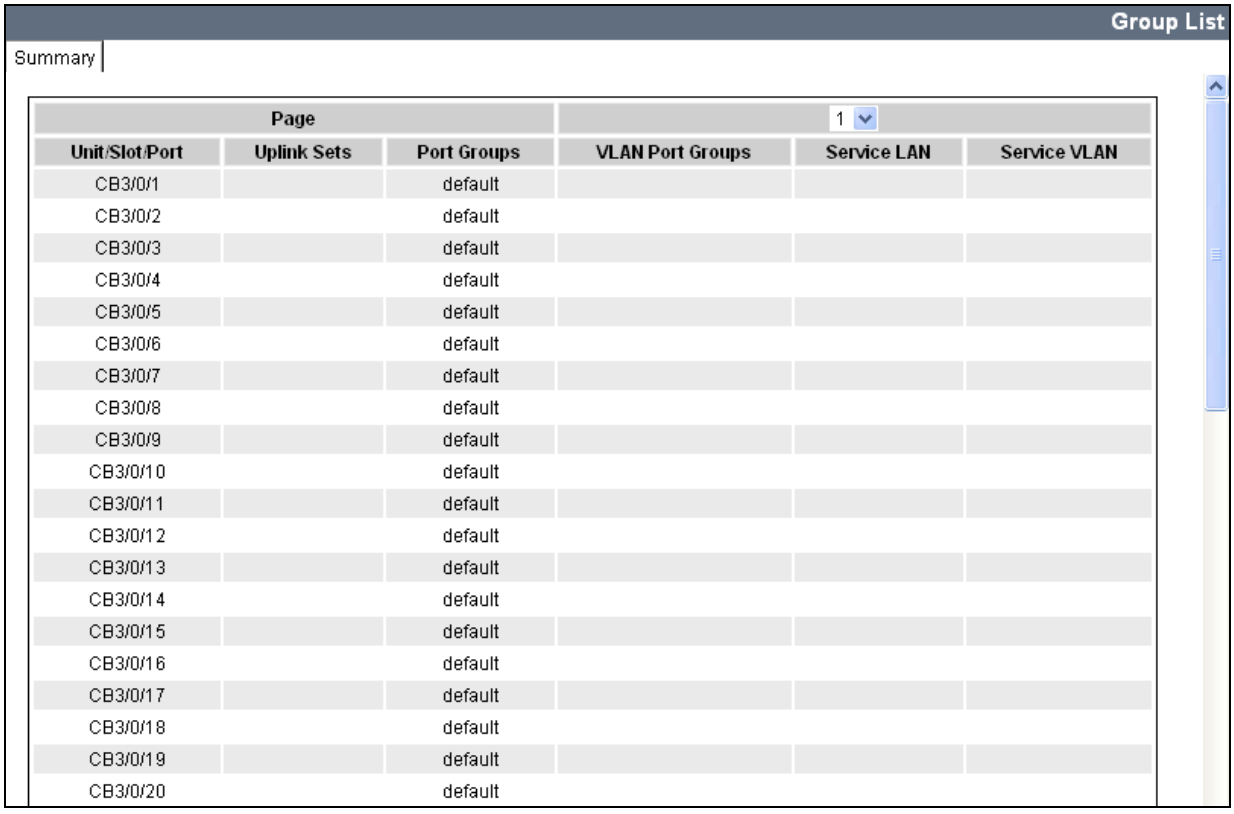

Figure : Group List Summary

Non-Configurable Data

Unit/Slot/Port - Identifies the port.

Uplink Sets - The group name of Uplink Sets.

Port Groups - The group name of Port Groups.

VLAN Port Groups - The group name of VLAN Port Groups.

Service LAN - The group name of Service LAN.

Service VLAN - The group name of Service VLAN.

Command Buttons

Refresh - Re-fetch the configuration value again.

8.3.2 Uplink Sets

An "Uplink Set" is defined as a set of 1 to n external (uplink) ports, which is be used in port group definitions to connect a group of server blades to the customer's LAN. The purpose of the uplink set configuration is to create groups, and to add or modify the existing external ports to groups. Link state, port backup, and IGMP snooping of the uplink set groups can be configured in this page.

8.3.2.1 Config

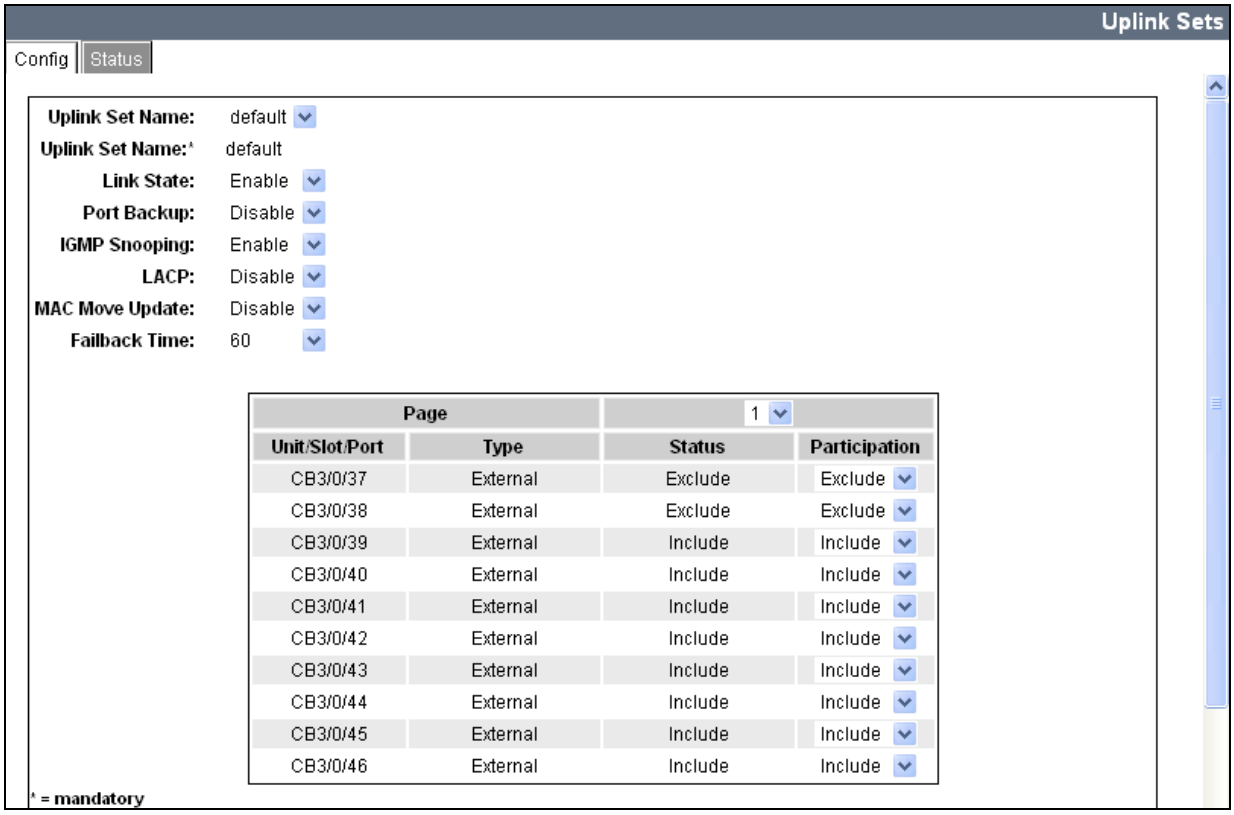

Figure : Uplink Sets Config

Selection Criteria

Uplink Set Name - Use this pull-down menu to select one of the existing uplink set.

Link State - Use this pull-down menu to configure link state.

Port Backup - Use this pull-down menu to configure port backup.

IGMP Snooping - Use this pull-down menu to configure IGMP snooping.

LACP - Use this pull-down menu to configure LACP.

Participation - Use this field to specify whether a interface will participate in this uplink set. The factory default is 'Exclude'. The possible values are:

- Include - This interface is the member of the uplink set.
- Exclude - This interface is not the member of the uplink set.

Configurable Data

Uplink Set Name - Input the uplink set name to create a new group.

Non-Configurable Data

Unit/Slot/Port - The interface.

Type - The interface type. Type should be External.

Status - The interface is belong to this uplink set or not.

Command Buttons

Apply - Update the IBP with the values on this screen. If you want the IBP to retain the new values across a power cycle, you must perform a save.

Delete - Delete the Uplink Set. You are not allowed to delete the "default" uplink set.

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8.3.2.2 Status

This page displays the status of all currently configured Uplink Set.

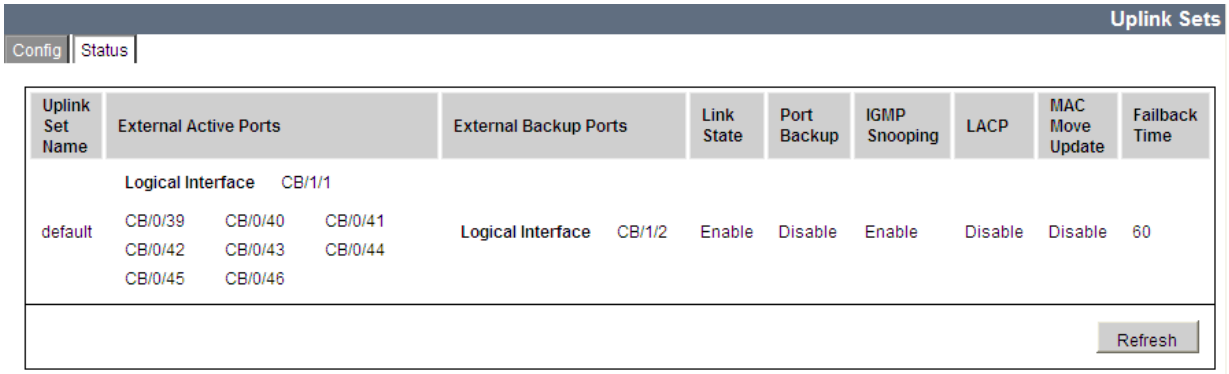

Figure : Uplink Sets Status

Non-Configurable Data

Uplink Set Name - The name of the uplink set.

External Active Ports - List the external active port members.

External Backup Ports - List the external backup port members.

Logical Interface - List the logical interfaces.

Link State - The status of link state.

Port Backup - The status of backup.

IGMP Snooping - The status of IGMP Snooping.

LACP - The status of LACP.

MAC Move Update - The status of MAC Move Update mode.

Failback Time - The time delay for activating the active port if the link of active port is resumed.

Command Buttons

Refresh - Re-fetch the configuration value again.

8.3.3 Port Groups

The purpose of the port group configuration is to create port groups, and to modify the existing port groups. Only the internal ports could be defined to be the member of the port groups. The external connection is defined by specifying an Uplink Set.

8.3.3.1 Config

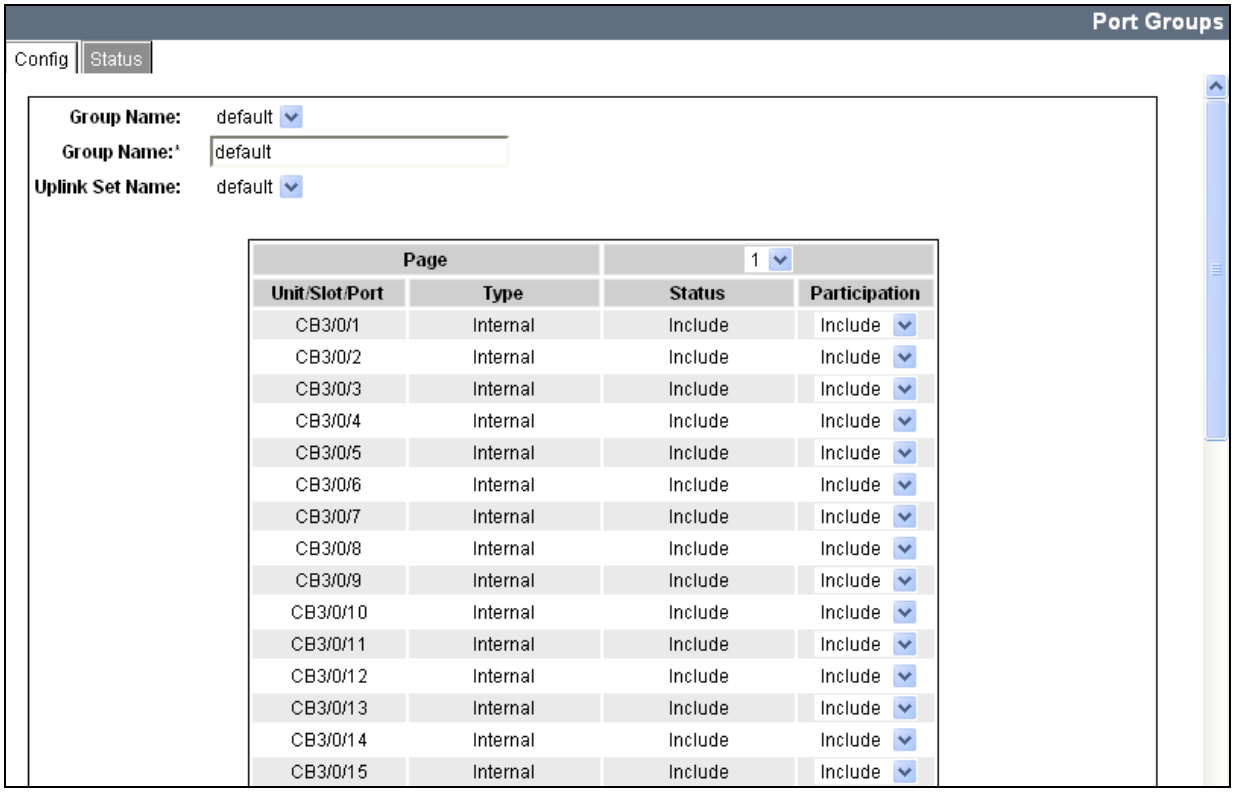

Figure : Port Groups Config

Selection Criteria

Group Name - Use this pull-down menu to select one of the existing groups.

Uplink Set Name - Use this pull-down menu to specify the external connection. If the pull down menu shows "----------", it means that there is no available uplink set.

Participation - Use this field to specify whether a interface will participate in this port group. The factory default is 'Exclude'. The possible values are:

- Include - This interface is the member of the port group.
- Exclude - This interface is not the member of the port group.

Configurable Data

Group Name - Input the group name to create a new port group.

Non-Configurable Data

Unit/Slot/Port - The interface.

Type - The interface type. Type should be Internal or Port Channel.

Status - The interface is belong to this port group or not.

Command Buttons

Apply - Update the IBP with the values on this screen. If you want the IBP to retain the new values across a power cycle, you must perform a save.

Delete - Delete the port group. You are not allowed to delete the "default" port group.

8.3.3.2 Status

This page displays the status of all currently configured port group.

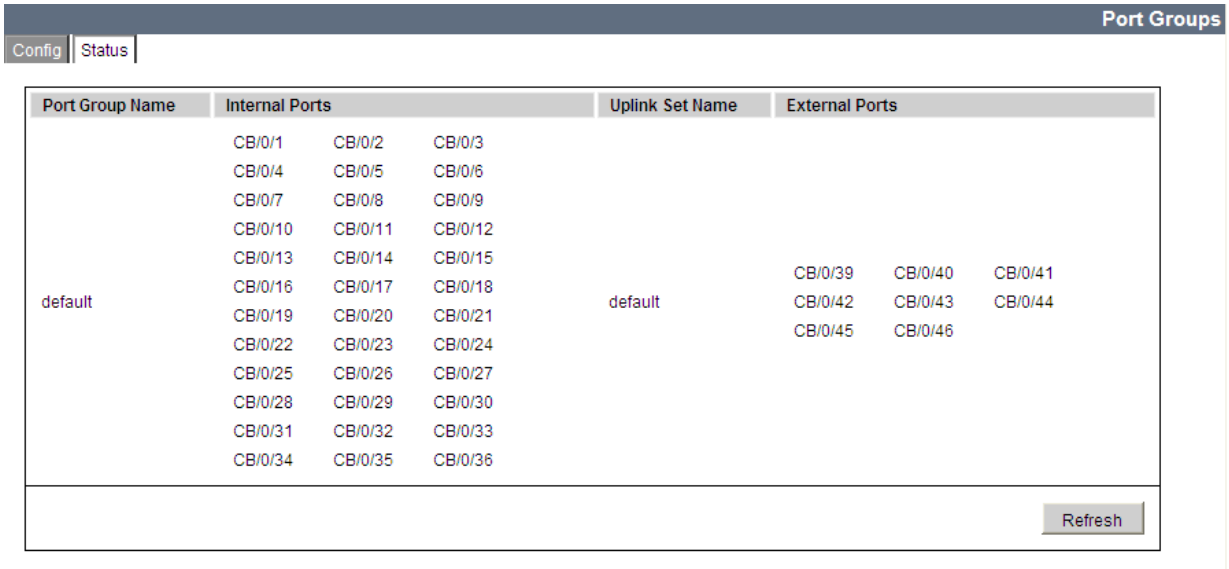

Figure : Port Groups Status

Non-Configurable Data

Port Group Name - The group name of the port group.

Internal Ports - List the internal port members.

Uplink Set Name - The name of the uplink set.

External Ports - List the external ports of the port group.

Command Buttons

Refresh - Re-fetch the configuration value again.

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8.3.4 VLAN Port Groups

8.3.4.1 Config

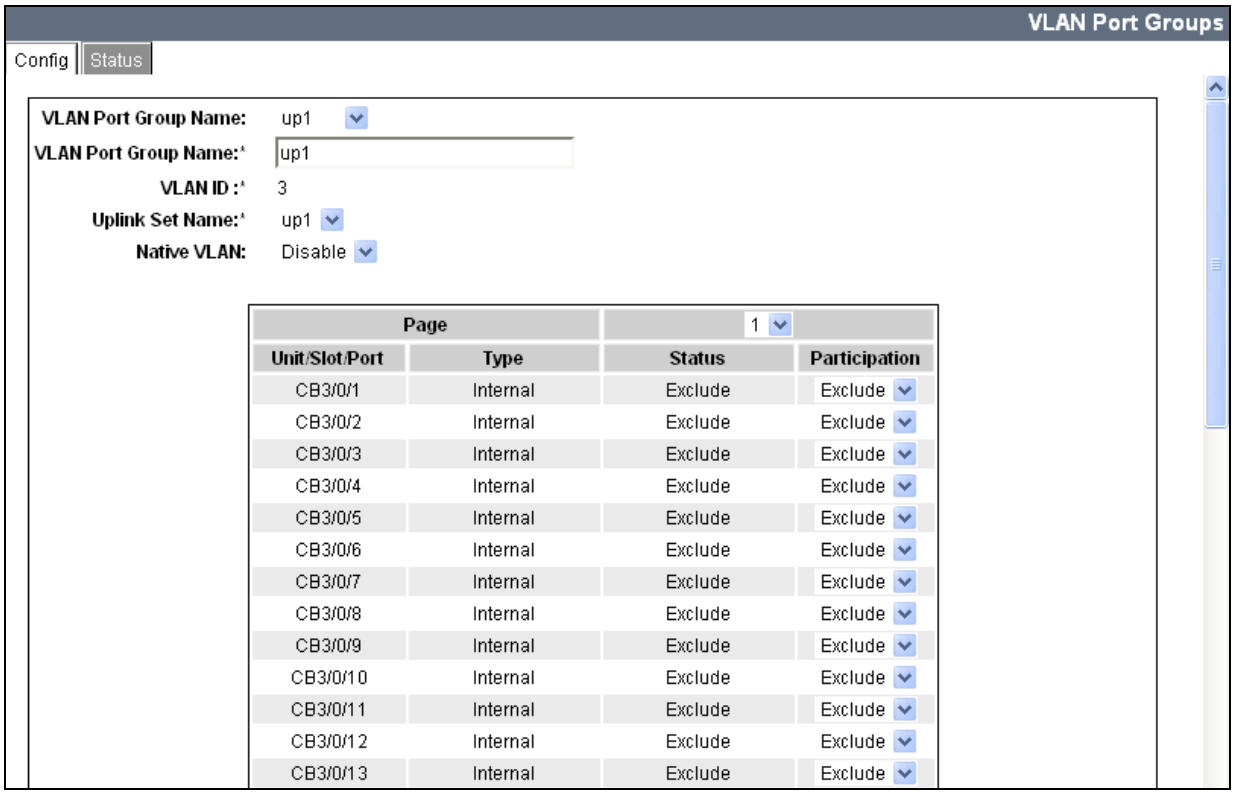

Figure : VLAN Port Groups Config

Selection Criteria

VLAN Port Group Name - You can use this screen to configure an existing VLAN Port Group, or to create a new one. Use this pull down menu to select one of the existing VLAN Port Groups, or select 'Create' to add a new one.

Uplink Set Name - Specify the uplink set for the external connection. If the pull down menu shows "----------", it means that there is no available uplink set.

Native VLAN - Change the behavior of the external interfaces: to process/forward untagged packets only.

- Enable - The external interfaces of this group will only process/forward the untagged packets.
- Disable - The external interfaces of this group will process/forward both tagged and untagged packets.

Participation - Use this field to specify whether a interface will participate in this VLAN Port Group. The factory default is 'Exclude'. The possible values are:

- Include - This interface is the member of the VLAN Port Group.
- Exclude - This interface is not the member of the VLAN Port Group.
- Tagged - This interface is the member of the VLAN Port Group with tagged property.

Configurable Data

VLAN Port Group Name - Specify the name for the new VLAN Port Group.

VLAN ID - Specify the VLAN Identifier for the VLAN Port Group. The range of the VLAN ID is (1 to 4093) .

Non-Configurable Data

Unit/Slot/Port - The interface.

Type - The interface type. Type should be Internal or Port Channel.

Status - Indicates the current value of the participation parameter for the interface.

Command Buttons

Apply - Update the IBP with the values on this screen. If you want the IBP to retain the new values across a power cycle, you must perform a save.

Delete - Delete a VLAN Port Group.

8.3.4.2 Status

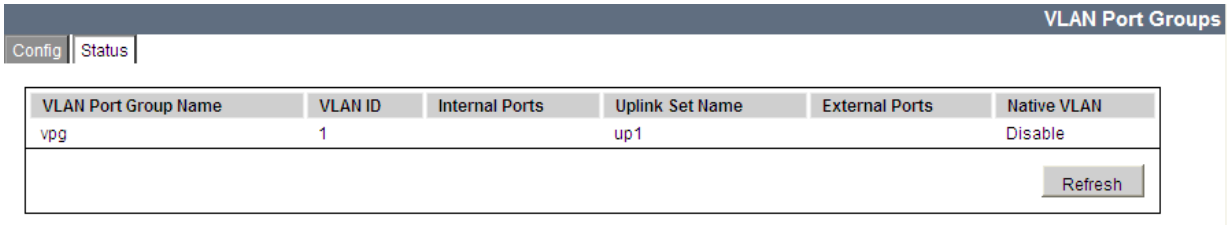

Figure : VLAN Port Groups Status

This page displays the status of all currently configured VLAN Port Groups.

Non-Configurable Data

VLAN Port Group Name - The name for the VLAN Port Group.

VLAN ID - The VLAN Identifier of the VLAN Port Group. The range of the VLAN ID is (1 to 4093) .

Internal Ports - Internal interface, member of that VLAN Port Group.

Uplink Set Name - Specify the Uplink Set for the external connection.

External Ports - External interface, member of the specified Uplink Set.

Native VLAN - Change the behavior of external interfaces: to process/forward untagged packets only.

Command Buttons

Refresh - Re-fetch the configuration value again.

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8.3.5 Service LAN

8.3.5.1 Config

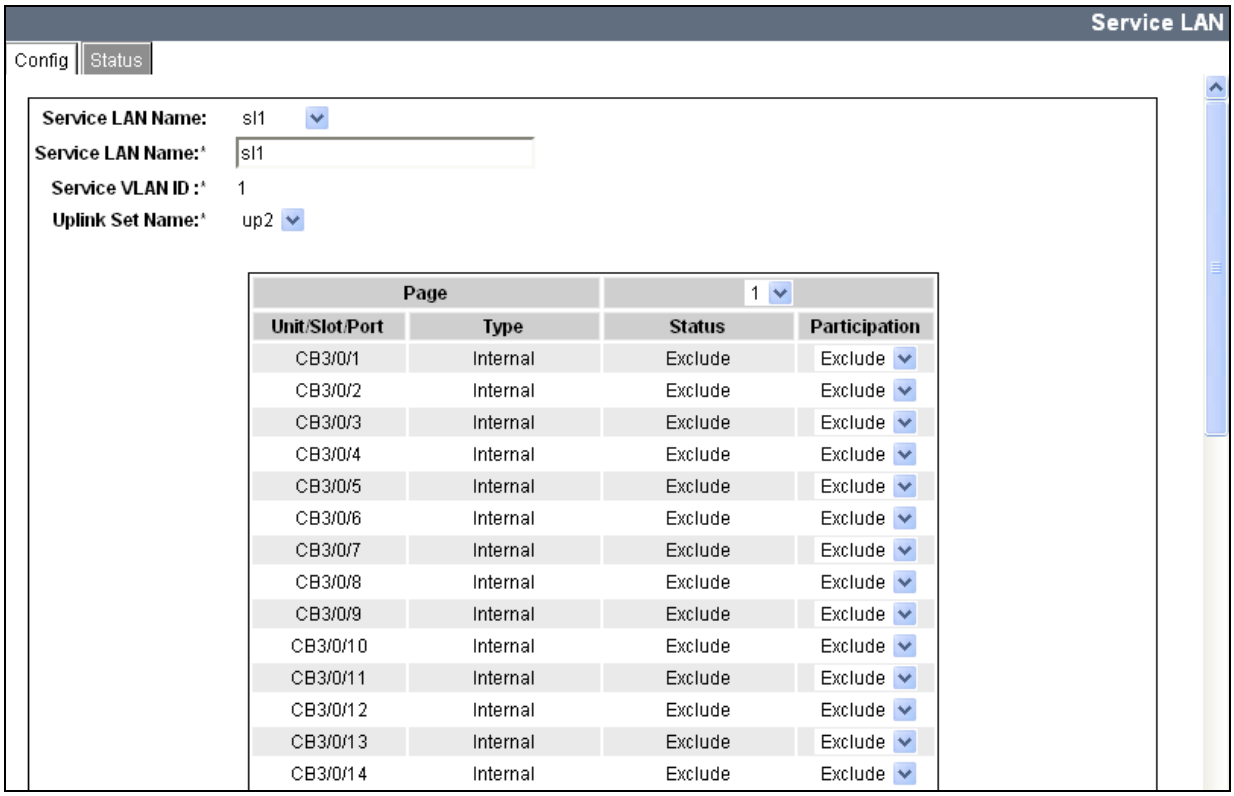


Figure : Service LAN Config

Selection Criteria

Service LAN Name - You can use this screen to configure an existing Service LAN, or to create a new one. Use this pull down menu to select one of the existing Service LAN, or select 'Create' to add a new one.

Uplink Set Name - Specify the uplink set for the external connection. If the pull down menu shows "----------", it means that there is no available uplink set.

Participation - Use this field to specify whether a interface will participate in this Service LAN. The factory default is 'Exclude'. The possible values are:

- Include - This interface is the member of the Service LAN.
- Exclude - This interface is not the member of the Service LAN.

Configurable Data

Service LAN Name - Specify the name for the new Service LAN.

Service VLAN ID - Specify the VLAN Identifier for the Service LAN. The range of the VLAN ID is (1 to 4093) .

Non-Configurable Data

Unit/Slot/Port - The interface.

Type - The interface type. Type should be Internal or Port Channel.

Status - Indicates the current value of the participation parameter for the interface.

Command Buttons

Apply - Update the IBP with the values on this screen. If you want the IBP to retain the new values across a power cycle, you must perform a save.

Delete - Delete a Service LAN.

8.3.5.2 Status

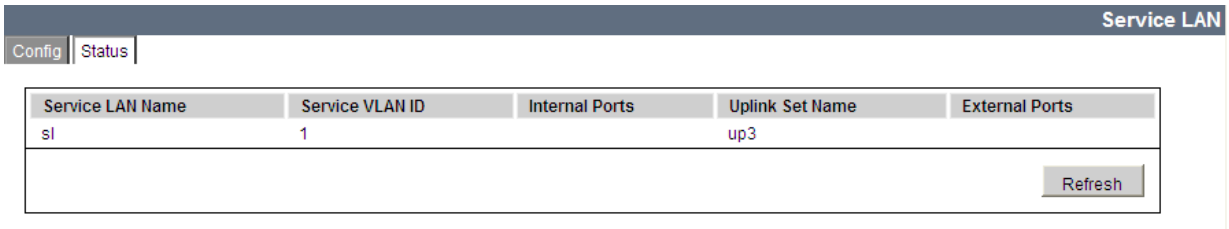


Figure : Service LAN Status

This page displays the status of all currently configured Service LAN.

Non-Configurable Data

Service LAN Name - The name for the Service LAN.

Service VLAN ID - The VLAN Identifier of the Service LAN. The range of the VLAN ID is (1 to 4093) .

Internal Ports - Internal interface, member of that Service LAN.

Uplink Set Name - Specify the Uplink Set for the external connection.

External Ports - External interface, member of the specified Uplink Set.

Command Buttons

Refresh - Re-fetch the configuration value again.

8.3.6 Service VLAN

8.3.6.1 Config

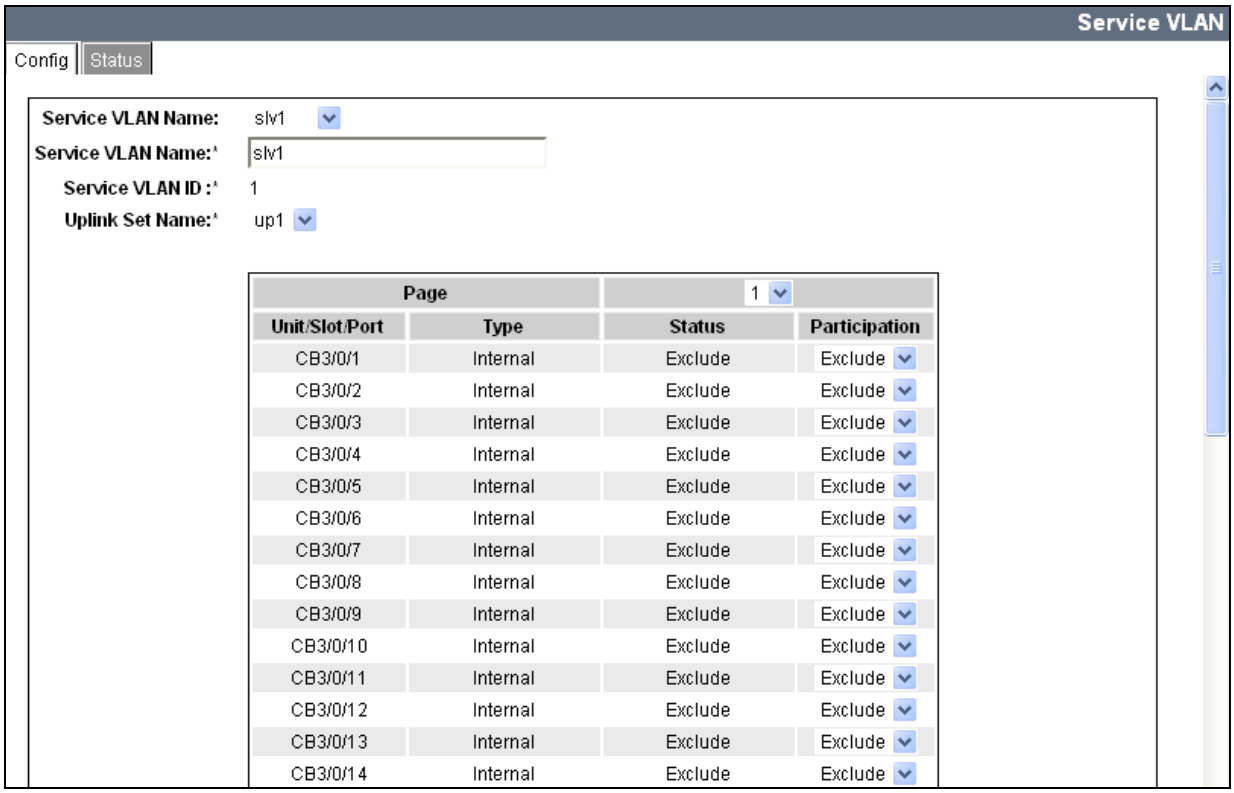


Figure : Service VLAN Config

Selection Criteria

Service VLAN Name - You can use this screen to configure an existing Service VLAN, or to create a new one. Use this pull down menu to select one of the existing Service VLAN, or select 'Create' to add a new one.

Uplink Set Name - Specify the uplink set for the external connection. If the pull down menu shows "----------", it means that there is no available uplink set.

Participation - Use this field to specify whether a interface will participate in this Service VLAN. The factory default is 'Exclude'. The possible values are:

- Include - This interface is the member of the Service VLAN.
- Exclude - This interface is not the member of the Service VLAN.

Configurable Data

Service VLAN Name - Specify the name for the new Service VLAN.

Service VLAN ID - Specify the VLAN Identifier for the Service VLAN. The range of the VLAN ID is (1 to 4093) .

Non-Configurable Data

Unit/Slot/Port - The interface.

Type - The interface type. Type should be Internal or Port Channel.

Status - Indicates the current value of the participation parameter for the interface.

Command Buttons

Apply - Update the IBP with the values on this screen. If you want the IBP to retain the new values across a power cycle, you must perform a save.

Delete - Delete a Service VLAN.

8.3.6.2 Status

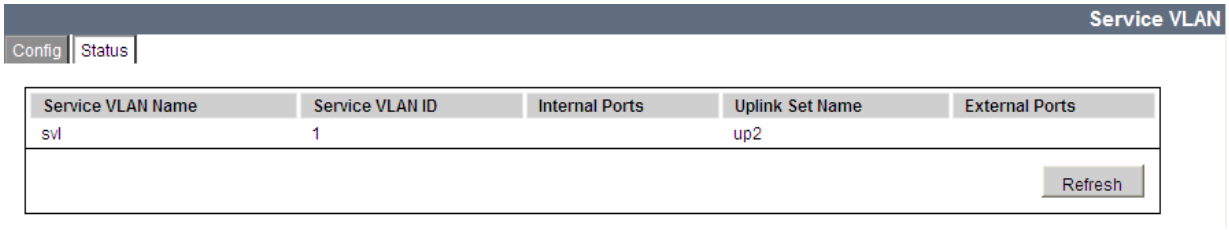


Figure : Service VLAN Status

This page displays the status of all currently configured Service VLAN.

Non-Configurable Data

Service VLAN Name - The name for the Service VLAN.

Service VLAN ID - The VLAN Identifier of the Service VLAN. The range of the VLAN ID is (1 to 4093) .

Internal Ports - Internal interface, member of that Service VLAN.

Uplink Set Name - Specify the Uplink Set for the external connection.

External Ports - External interface, member of the specified Uplink Set.

Command Buttons

Refresh - Re-fetch the configuration value again.

8.3.7 Auto VLAN

8.3.7.1 Config

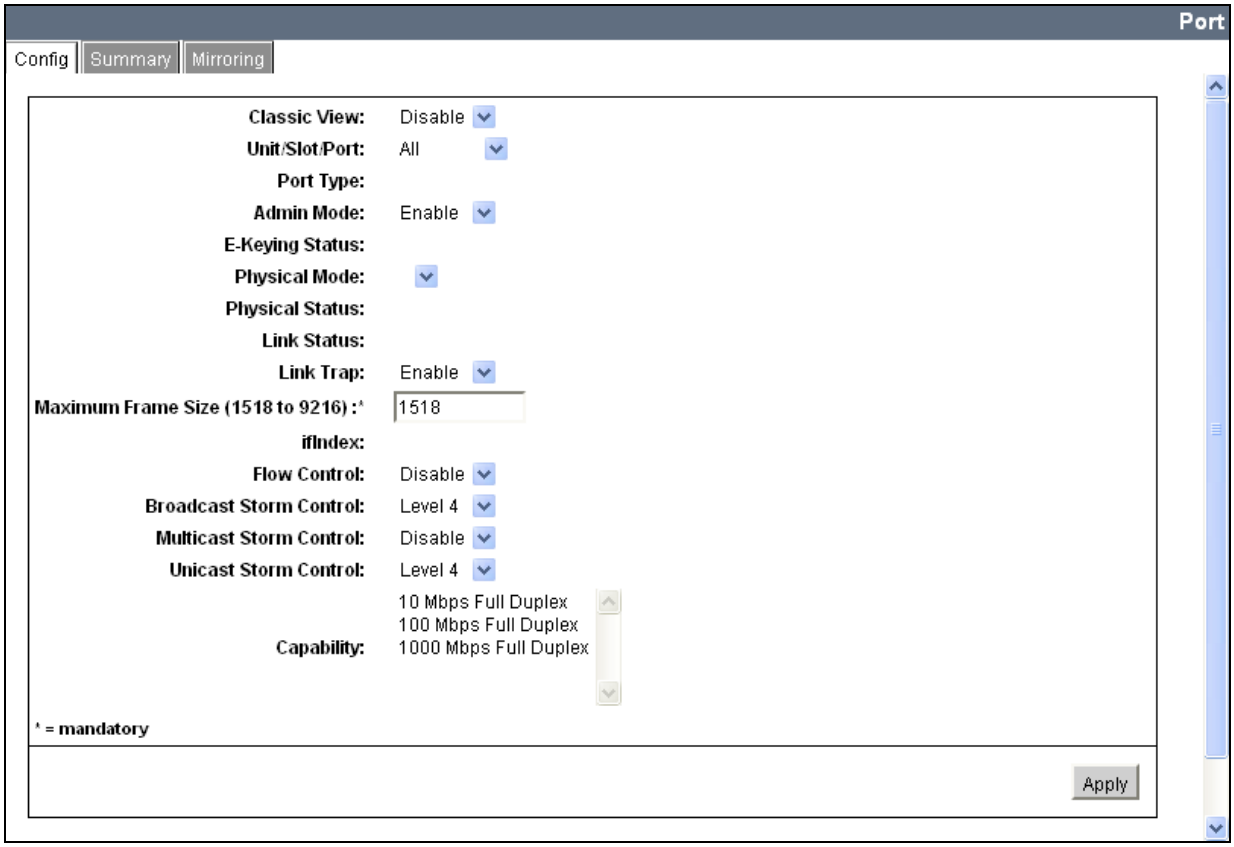


Figure : Auto VLAN Config

Selection Criteria

Global Port Mode - Specifies the Auto VLAN Global Port mode. It has two options : Disable and Enable.

Interface - Specifies the list of all the physical ports on which Auto VLAN can be configured.

Port Mode - Specifies the Auto VLAN Port mode for the selected interface. It has two options : Disable and Enable.

Configurable Data

Aging Time - Specifies the Aging Time in seconds. The range is from (10 to 1000000). Default value is 300 seconds. Aging time 0 means the learned VLAN will not be aged out.

Threshold - Specifies the Threshold in seconds. The range is from (5 to 15). Default value is 5 seconds.

Command Buttons

Apply - Send the updated screen to the switch and cause the changes to take effect on the switch but these changes will not be retained across a power cycle unless a save is performed.

8.3.7.2 Status

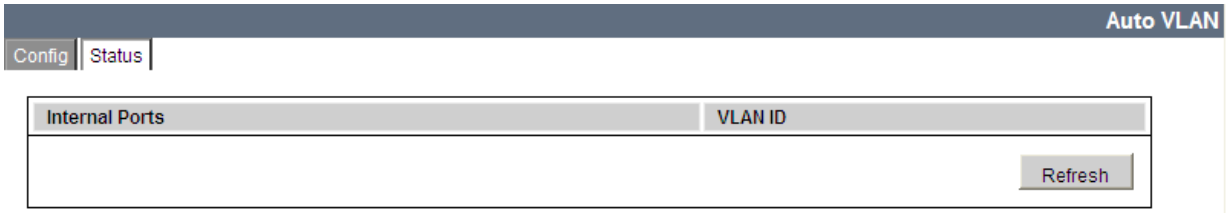


Figure : Auto VLAN Status

This page displays the status of all currently configured Auto VLAN.

Non-Configurable Data

Internal Ports - Specifies the list of all the physical ports.

VLAN ID - Specifies the VLAN ID that the interface learned.

Command Buttons

Refresh - Updates the information on the page.

8.3.8 Port

8.3.8.1 Config

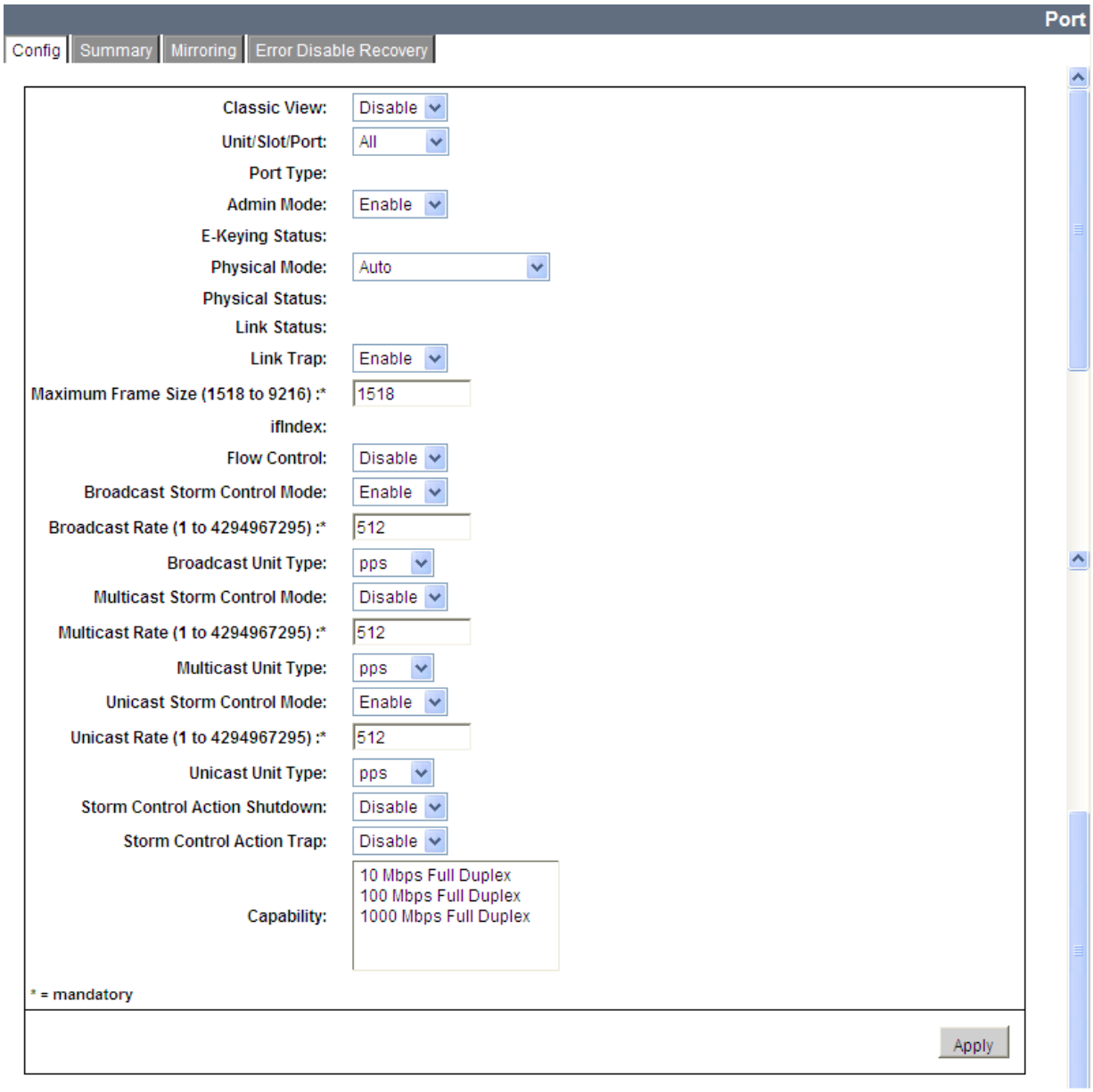


Figure : Port Config

Selection Criteria

Class View - Use pulldown menu to enable Classic View for port-identifiers. Example for Classic View: enabled:"interface 1/0/1" | disabled:"interface BX900S1123456-CB1/0/1". When Unit/Slot/Port is "All" and Classic View is changed, the other modifications will not be applied.

Unit/Slot/Port - Selects the interface for which data is to be displayed or configured.

Admin Mode - Use the pull down menu to select the Port control administration state. You must select enable if you want the port to participate in the network. The factory default is enabled.

Physical Mode - Use the pull down menu to select the port's speed and duplex mode. If you select auto the duplex mode and speed will be set by the auto-negotiation process. Note that the port's maximum capability (full duplex and 100 Mbps) will be advertised. Otherwise, your selection will determine the port's duplex mode and transmission rate. The factory default is auto. The selection when applied against the "All" option in Slot/Port is applied to all applicable interfaces only.

Link Trap - This object determines whether or not to send a trap when link status changes. The factory default is enabled.

Flow Control - Used to enable or disable flow control feature on selected interface.

Broadcast Storm Control Mode - Used to enable or disable broadcast storm feature on selected interface.

Broadcast Rate - Set the bit/packet rate value on selected interface. The valid values are from (1 to 4294967295).

Broadcast Unit Type - Set the rate Unit Type on selected interface. The possible values are:

- bps - bit per second.
- K bps - 1000(Kilo) bits per second
- M bps - 1,000,000(Mega) bits per second
- G bps - 1,000,000,000(Giga) bits per second
- pps - packet per second
- K pps - 1000(Kilo) packets per second
- M pps - 1,000,000(Mega) packets per second
- G pps - 1,000,000,000(Giga) packets per second

Example : If Broadcast Rate=128, Broadcast Unit Type=bps. It means the speed of the interface will restrict to 128bps.

Multicast Storm Control Mode - Used to enable or disable multicast storm feature on selected interface.

Multicast Rate - Set the bit/packet rate value on selected interface. The valid values are from (1 to 4294967295).

Multicast Unit Type - Set the rate Unit Type on selected interface. The possible values are:

- bps - bit per second.
- K bps - 1000(Kilo) bits per second
- M bps - 1,000,000(Mega) bits per second
- G bps - 1,000,000,000(Giga) bits per second
- pps - packet per second
- K pps - 1000(Kilo) packets per second
- M pps - 1,000,000(Mega) packets per second
- G pps - 1,000,000,000(Giga) packets per second

Example : If Multicast Rate=128, Multicast Unit Type=bps. It means the speed of the interface will restrict to 128bps.

Unicast Storm Control Mode - Used to enable or disable unicast storm feature on selected interface.

Unicast Rate - Set the bit/packet rate value on selected interface. The valid values are from (1 to 4294967295).

Unicast Unit Type - Set the rate Unit Type on selected interface. The possible values are:

- bps - bit per second.
- K bps - 1000(Kilo) bits per second
- M bps - 1,000,000(Mega) bits per second
- G bps - 1,000,000,000(Giga) bits per second
- pps - packet per second
- K pps - 1000(Kilo) packets per second
- M pps - 1,000,000(Mega) packets per second
- G pps - 1,000,000,000(Giga) packets per second

Example : If Unicast Rate=128, Unicast Unit Type=bps. It means the speed of the interface will restrict to 128bps.

Storm Control Action Shutdown - Used to enable or disable to shutdown the selected interface while the storm is detected.

Storm Control Action Trap - Used to enable or disable to send trap for the selected interface while the storm is detected.

Configurable Data

Downlink Isolation - Use the pull down menu to enable or disable downlink isolation for the port.

Maximum Frame Size - The maximum Ethernet frame size the interface supports or is configured, including Ethernet header, CRC, and payload. (1518 to 9216). The default maximum frame size is 1518 .

Capability - You could advertise the port capabilities of a given interface during auto-negotiation.

Port Description - Description string attached to a port. It can be of up to 64 characters in length.

Non-Configurable Data

Port Type - For normal ports this field will be blank. Otherwise the possible values are:

- Source - the port is a monitoring port. Look at the Port Monitoring screens for more information.
- Destination - the port is a monitoring port. Look at the Port Monitoring screens for more information.
- Port Channel - the port is a member of a Link Aggregation trunk. Look at the LAG screens for more information.

E-Keying Status - Indicates the E-Keying Status.

Physical Status - Indicates the port speed and duplex mode.

Link Status - Indicates whether the Link is up or down.

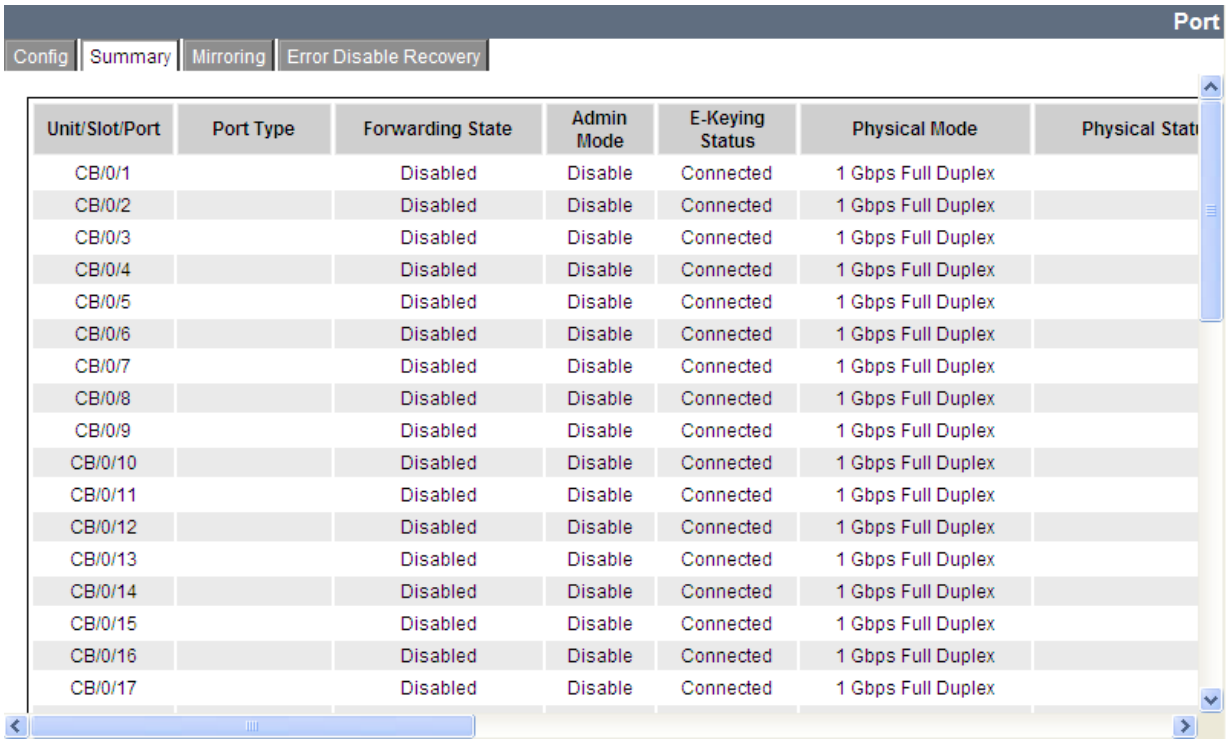
ifIndex - The ifIndex of the interface table entry associated with this port.

Command Buttons

Clear Config - Select this button to have all configuration parameters of this interface reset to their factory default values. All changes you have made will be lost, even if you have issued a save.

Apply - Update the IBP with the values you entered. If you want the IBP to retain the new values across a power cycle you must perform a save.

8.3.8.2 Summary



Unit/Slot/Port	Port Type	Forwarding State	Admin Mode	E-Keying Status	Physical Mode	Physical Stat
CB/0/1		Disabled	Disable	Connected	1 Gbps Full Duplex	
CB/0/2		Disabled	Disable	Connected	1 Gbps Full Duplex	
CB/0/3		Disabled	Disable	Connected	1 Gbps Full Duplex	
CB/0/4		Disabled	Disable	Connected	1 Gbps Full Duplex	
CB/0/5		Disabled	Disable	Connected	1 Gbps Full Duplex	
CB/0/6		Disabled	Disable	Connected	1 Gbps Full Duplex	
CB/0/7		Disabled	Disable	Connected	1 Gbps Full Duplex	
CB/0/8		Disabled	Disable	Connected	1 Gbps Full Duplex	
CB/0/9		Disabled	Disable	Connected	1 Gbps Full Duplex	
CB/0/10		Disabled	Disable	Connected	1 Gbps Full Duplex	
CB/0/11		Disabled	Disable	Connected	1 Gbps Full Duplex	
CB/0/12		Disabled	Disable	Connected	1 Gbps Full Duplex	
CB/0/13		Disabled	Disable	Connected	1 Gbps Full Duplex	
CB/0/14		Disabled	Disable	Connected	1 Gbps Full Duplex	
CB/0/15		Disabled	Disable	Connected	1 Gbps Full Duplex	
CB/0/16		Disabled	Disable	Connected	1 Gbps Full Duplex	
CB/0/17		Disabled	Disable	Connected	1 Gbps Full Duplex	

Figure : Port Summary

This screen displays the status for all ports in the box.

Non-Configurable Port Status Data

Unit/Slot/Port - Identifies the port

Port Type - For normal ports this field will be blank. Otherwise the possible values are:

- Source - the port is a monitoring port. Look at the Port Monitoring screens for more information.
- Destination - the port is a monitoring port. Look at the Port Monitoring screens for more information.
- Port Channel - the port is a member of a Link Aggregation trunk. Look at the LAG screens for more information.

Forwarding State - The port's current state Spanning Tree state. This state controls what action a port takes on receipt of a frame. If the bridge detects a malfunctioning port it will place that port into the broken state. The other five states are defined in IEEE 802.1D:

- Disabled
- Blocking
- Listening
- Learning
- Forwarding
- Broken

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Admin Mode - The Port control administration state. The port must be enabled in order for it to be allowed into the network. The factory default is enabled.

E-Keying Status - Indicates the E-Keying status of the port.

Physical Mode - Indicates The port speed and duplex mode. In auto-negotiation mode the duplex mode and speed are set from the auto-negotiation process.

Physical Status - Indicates the port speed and duplex mode.

Link Status - Indicates whether the Link is up or down.

Link Trap - Indicates whether or not the port will send a trap when link status changes.

ifIndex - Indicates the ifIndex of the interface table entry associated with this port.

Flow Control - Indicates the status of flow control on this port.

Downlink Isolation - Indicates the state of downlink isolation for the port.

Broadcast Storm Control - Indicate the status of the broadcast storm control, disable or its rate.
Multicast Storm Control - Indicate the status of the multicast storm control, disable or its rate.
Unicast Storm Control - Indicate the status of the unicast storm control, disable or its rate.

Storm Control Action - Indicates the status of storm control action shutdown/trap is enabled or disabled.

Capability - Indicates the port capabilities during auto-negotiation.

Port Description - Indicates the port description.

Command Buttons

Refresh - Re-fetch the configuration value again.

8.3.8.3 Mirroring

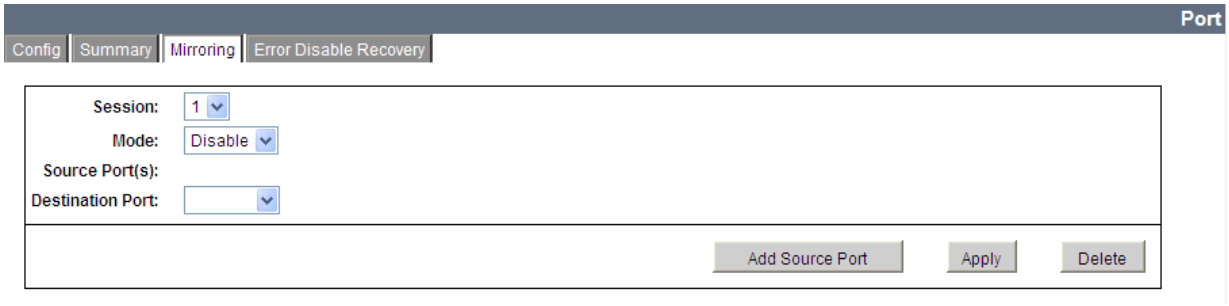

Figure : Port Mirroring

Selection Criteria

Session ID - Select a port mirroring session from the list. The number of sessions allowed is platform specific. By default the First Session is selected. Up to 1 sessions are supported.

Mode - Specifies the Session Mode for a selected session ID. The default Session Mode is disabled.

Destination Port - Acts as a probe port and will receive all the traffic from configured mirrored port(s). Default value is blank.

Configurable Data

Source Port(s) - Specifies the source port(s) with directions as mirrored port(s). Traffic of the source port(s) is sent to the probe port. Up to 368 source ports can be selected per session.

Command Buttons

Add Source Ports - To add Source Port(s) to the selected session.

Remove Source Ports - To remove the configured Source Port(s) of the selected session.

Apply - Send the updated screen to the IBP and cause the changes to take effect on the IBP.

Delete - Remove the selected session configuration.

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8.3.8.4 Error Disable Recovery

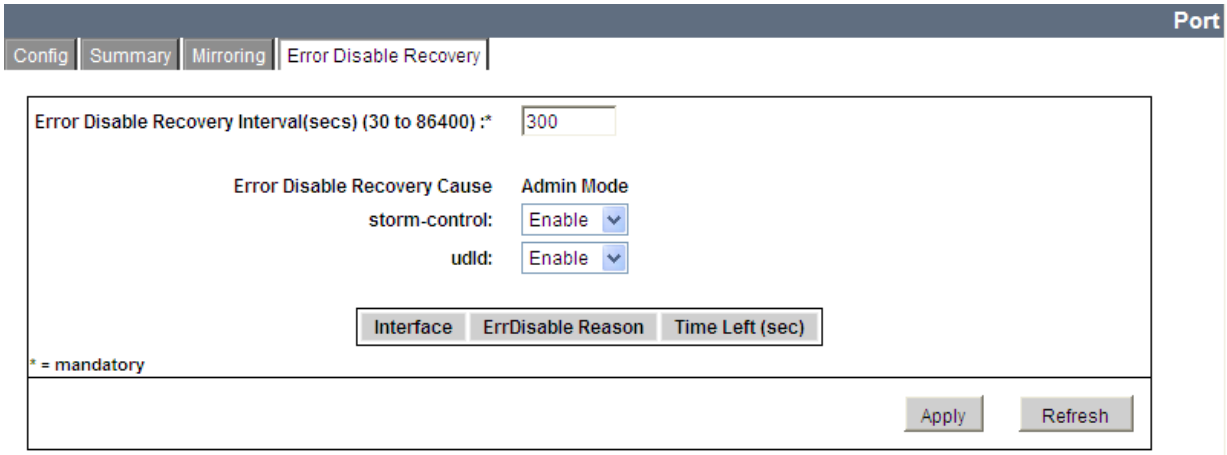

Figure : Port Error Disable Recovery

Selection Criteria

storm-control - Enables or disables the specify Error Disable Recovery Cause by storm-control. The factory default is disabled.

udld - Enables or disables the specify Error Disable Recovery Cause by udld. The factory default is disabled.

Configurable Data

Error Disable Recovery Interval - This Specifies the interval value for Error Disable Recovery. The factory default is 300 seconds. The range of Interval is (30 to 86400) .

Non-Configurable Data

Interface - This Specifies the interface which is shutdown by Error Disable.

ErrDisable Reason - This Specifies the reason why this interface is shutdown.

Time Left (sec) - This Specifies the left time of this interface will be enabled.

Command Buttons

Apply - Update the IBP with the values on this screen. If you want the IBP to retain the new values across a power cycle, you must perform a save.

Refresh - Refresh the data on the screen with the present state of the data in the IBP.

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8.3.9 Port Channel

8.3.9.1 Config

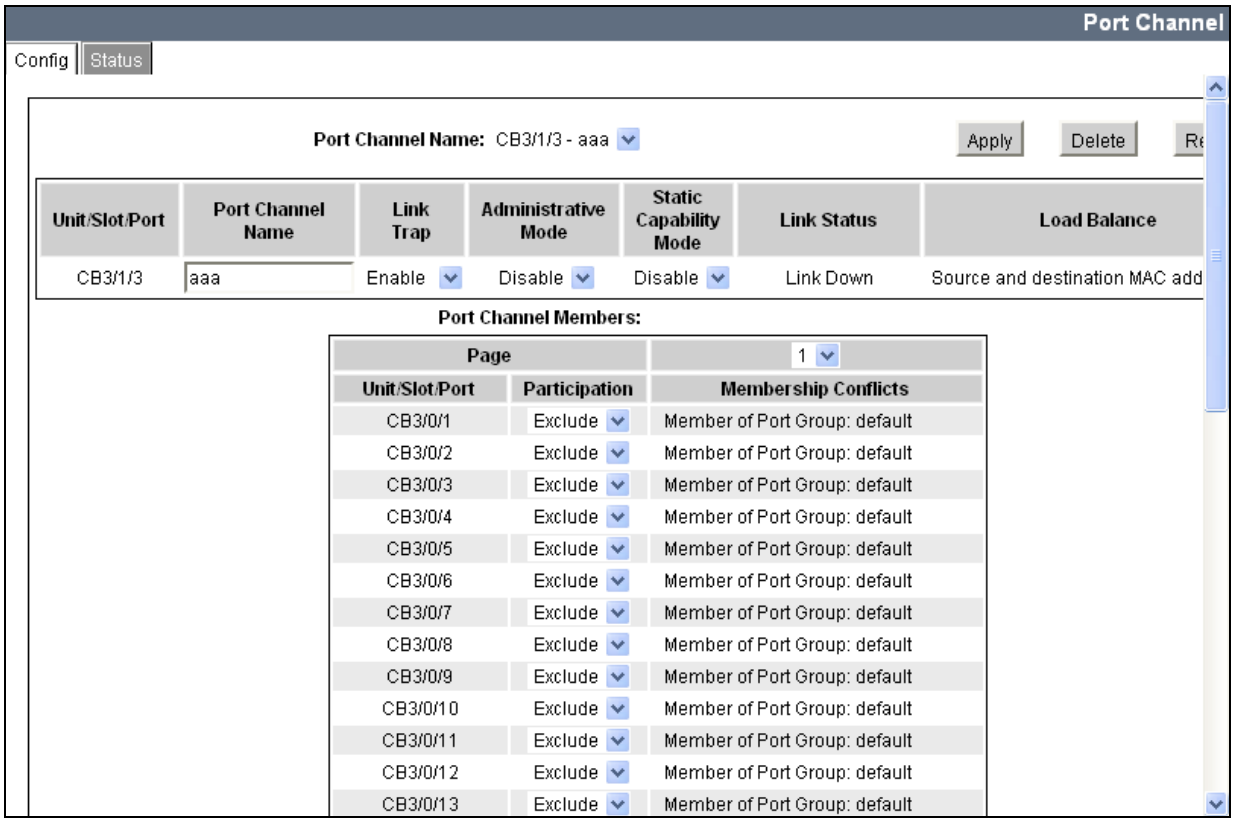

Figure : Port Channel Config

Selection Criteria

Port Channel Name – You can use this screen to reconfigure an existing Port Channel, or to create a new one. Use this pull down menu to select one of the existing Port Channels, or select 'Create' to add a new one. There can be a maximum of 64 Port Channels.

Link Trap - Specify whether you want to have a trap sent when link status changes. The factory default is enable, which will cause the trap to be sent.

Administrative Mode - Select enable or disable from the pull down menu. When the Port Channel is disabled no traffic will flow and LACPDUs will be dropped, but the links that form the Port Channel will not be released. The factory default is enable.

Static Capability Mode - May be enabled or disabled by selecting the corresponding line on the pull down entry field. The factory default is disabled. This field is non-configurable for read-only users.

Load Balance - Configure load balance mode for the interface port-channel. The possible values are:

- Source MAC address - Sets the mode on the source MAC address.
- Destination MAC address - Sets the mode on the destination MAC address.
- Source and destination MAC address - Sets the mode on the source and destination MAC addresses.

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- Source IP address - Sets the mode on the source IP address.
- Destination IP address - Sets the mode on the destination IP address.
- Source and destination IP address - Sets the mode on the source and destination IP addresses.

Participation - For each port specify whether it is to be included as a member of this Port Channel or not. The default is exclude. There can be a maximum of 8 ports assigned to a Port Channel.

Configurable Data

Port Channel Name - Enter the name you want assigned to the Port Channel. You may enter any string of up to 15 alphanumeric characters. A valid name has to be specified in order to create the Port Channel.

Non-Configurable Data

Slot/Port - Slot/Port identification of the Port Channel being configured. This field will not appear when a new Port Channel is being created.

Link Status - Indicates whether the Link is up or down.

Port Channel Members - List of members of the Port Channel in Slot/Port form.

Membership Conflicts - Shows ports that are already members of other Port Channels. A port may only be a member of one Port Channel at a time. If the entry is blank, it is not currently a member of any Port Channel.

Command Buttons

Apply - Update the IBP with the values on this screen. If you want the IBP to retain the new values across a power cycle, you must perform a save.

Delete - Removes the currently selected configured Port Channel. All ports that were members of this Port Channel are removed from the Port Channel and included in the default VLAN. This field will not appear when a new Port Channel is being created.

Refresh - Refresh the data on the screen with the present state of the data in the IBP.

8.3.9.2 Status

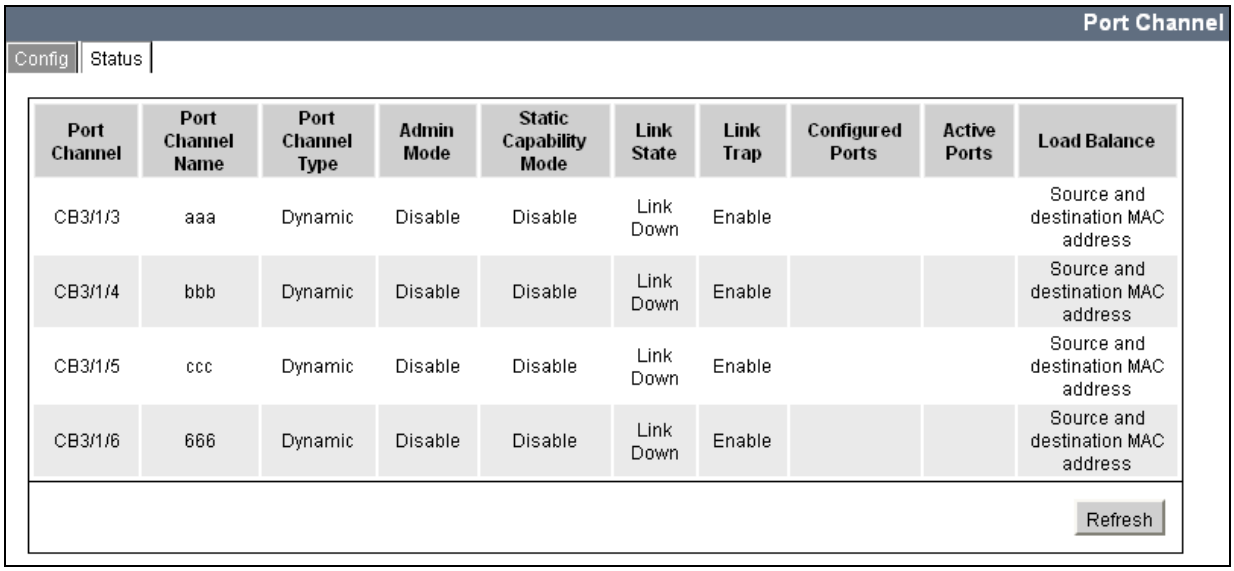
Port Channel
Config
Status
Port Channel
Port Channel Name
Port Channel Type
Admin Mode
Static Capability Mode
Link State
Link Trap
Configured Ports
Active Ports
Load Balance
CB3/1/3 aaa Dynamic Disable Disable Link Down Enable Source and destination MAC address
CB3/1/4 bbb Dynamic Disable Disable Link Down Enable Source and destination MAC address
CB3/1/5 ccc Dynamic Disable Disable Link Down Enable Source and destination MAC address
CB3/1/6 666 Dynamic Disable Disable Link Down Enable Source and destination MAC address
Refresh

Figure : Port Channel Status

Non-Configurable Data

Port Channel - The Slot/Port identification of the Port Channel.

Port Channel Name - The name of the Port Channel.

Port Channel Type - The type of this Port Channel.

Admin Mode - The Administrative Mode of the Port Channel, enable or disable.

Static Capability Mode - The Static Capability Mode of the Port Channel, enable or disable

Link Status - Indicates whether the Link is up or down.

Link Trap - Whether or not a trap will be sent when link status changes. The factory default is enable.

Configured Ports - A list of the ports that are members of the Port Channel, in Slot/Port notation. There can be a maximum of 8 ports assigned to a Port Channel.

Active Ports - A listing of the ports that are actively participating members of this Port Channel, in Slot/Port notation. There can be a maximum of 8 ports assigned to a Port Channel.

Load Balance - Display load balance mode information. The possible values are:

- Source MAC address - Sets the mode on the source MAC address.
- Destination MAC address - Sets the mode on the destination MAC address.
- Source and destination MAC address - Sets the mode on the source and destination MAC addresses.
- Source IP address - Sets the mode on the source IP address.
- Destination IP address - Sets the mode on the destination IP address.
- Source and destination IP address - Sets the mode on the source and destination IP addresses.

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8.3.10 Port Backup

Two link aggregation groups are associated with one port group as the port group is created. Two link aggregation groups are defined as active and backup port internally. One of two link aggregation groups will be activated at a time. For example, as active link aggregation group is link up, the backup aggregation group will be blocked (no traffic could be sent or received). Otherwise, if active aggregation group is link down (all members of the active aggregation group are link down), the backup aggregation group will be activated. As the active aggregation group is link up again, the backup aggregation group will be deactivated.

8.3.10.1 Config

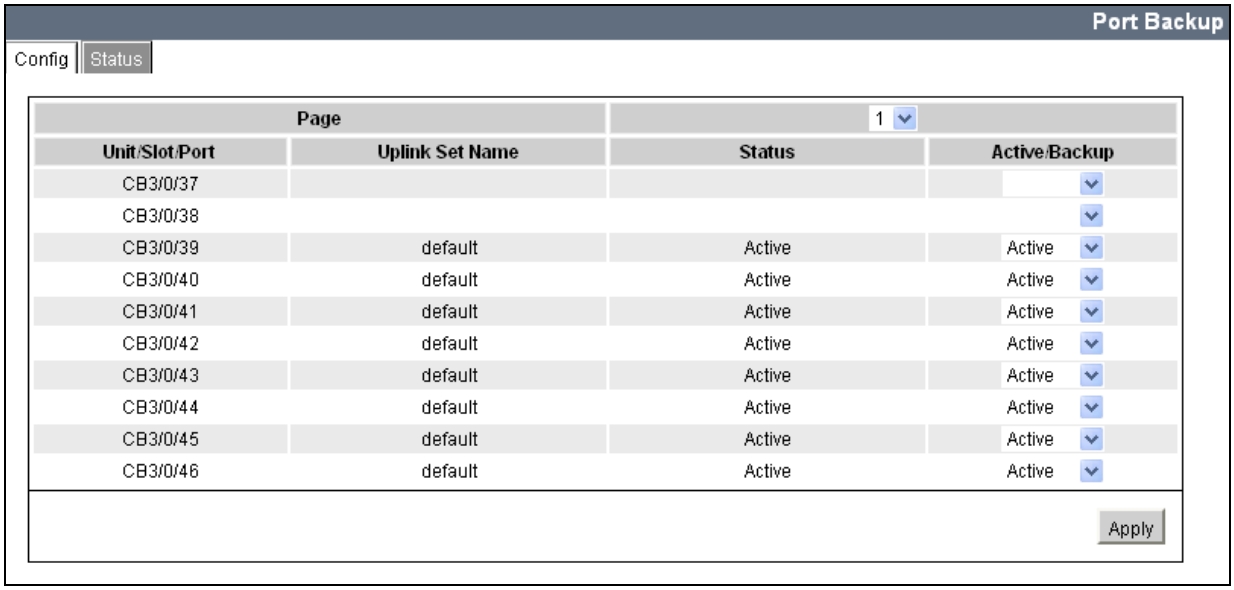

Figure : Port Backup Config

Configurable Data

Active/Backup - Select field to set the interface to be in active aggregation group or backup aggregation group.

Non-Configurable Data

Unit/Slot/Port - The interface.

Uplink Set Name - The name of uplink set that this interface belongs to.

Status - Active or Backup.

Command Buttons

Apply - Update the IBP with the values on this screen. If you want the IBP to retain the new values across a power cycle, you must perform a save.

8.3.10.2 Status

This page displays the status of all currently configured port-backup.

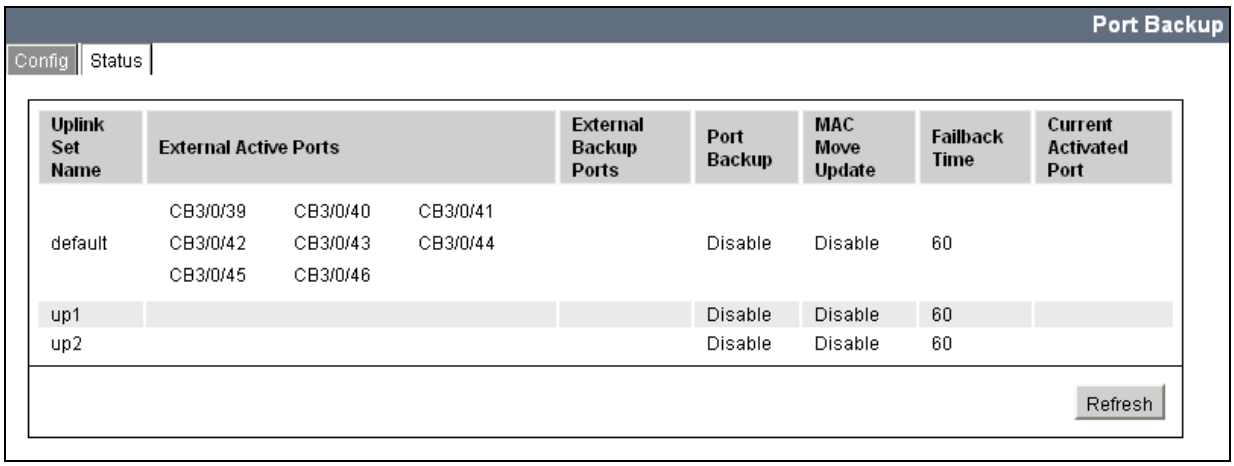

Figure : Port Backup Status

Non-Configurable Data

Uplink Set Name - The name of the Uplink Set.

External Active Ports - The configured external active port.

External Backup Ports - The configured external backup port.

Port Backup - Current port backup setting for the Uplink Set. (Enable or Disable)

MAC Move Update – The status of MAC Move Update mode.

Failback Time - The time delay for activating the active port if the link of active port is resumed.

Current Activated Port - Current activated port for the Uplink Set.

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8.4 Security Menu

This section provides users to configure IBP securities including 802.1x, RADIUS, TACACS+, LDAP, Access Control Lists, IP Filter, Secure HTTP, Secure Shell.

8.4.1 Port Access Control

8.4.1.1 Config

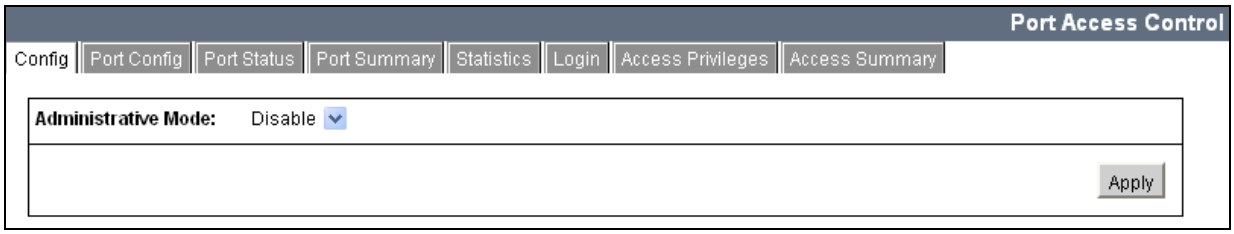

Figure : Port Access Control Config

Selection Criteria

Administrative Mode - This selector lists the two options for administrative mode: enable and disable. The default value is disable.

Command Buttons

Apply - Send the updated screen to the IBP and cause the changes to take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

8.4.1.2 Port Config

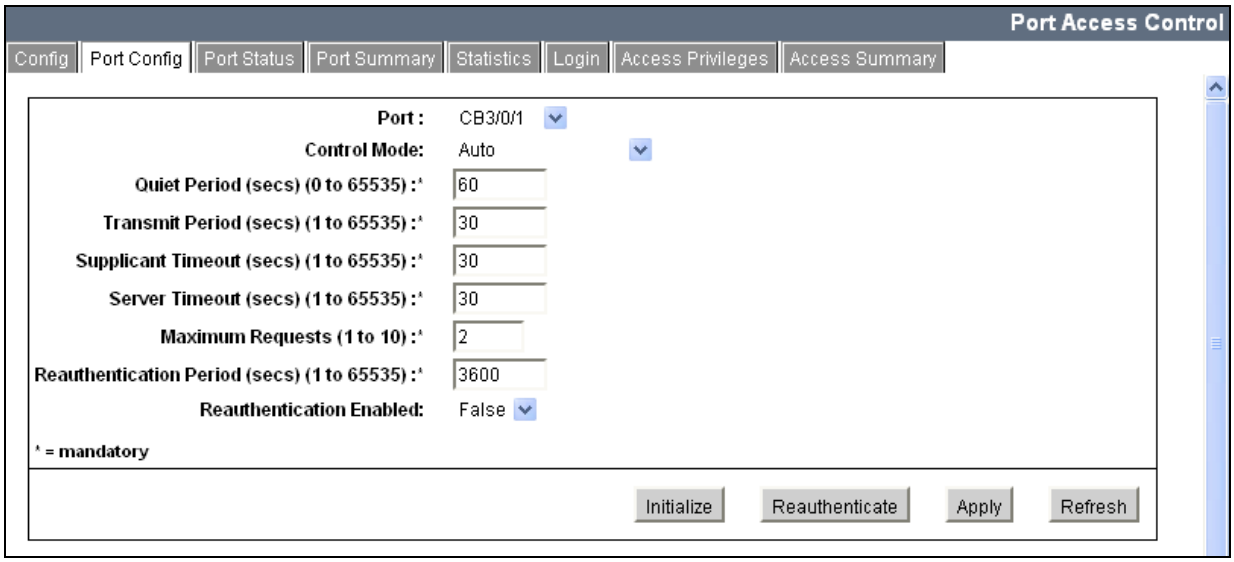

Figure : Port Access Control Port Config

Selection Criteria

Port - Selects the port to be configured. When the selection is changed, a screen refresh will occur causing all fields to be updated for the newly selected port. All physical interfaces are valid.

Control Mode - This selector lists the options for control mode. The control mode is only set if the link status of the port is link up. The options are:

- force unauthorized: The authenticator port access entity (PAE) unconditionally sets the controlled port to unauthorized
- force authorized: The authenticator PAE unconditionally sets the controlled port to authorized.
- auto: The authenticator PAE sets the controlled port mode to reflect the outcome of the authentication exchanges between the supplicant, authenticator, and the authentication server.

Reauthentication Enabled - This select field allows the user to enable or disable reauthentication of the supplicant for the specified port. The selectable values are 'true' and 'false'. If the value is 'true' reauthentication will occur. Otherwise, reauthentication will not be allowed. The default value is false. Changing the selection will not change the configuration until the Apply button is pressed.

Configurable Data

Quiet Period - This input field allows the user to configure the quiet period for the selected port. This command sets the value, in seconds, of the timer used by the authenticator state machine on this port to define periods of time in which it will not attempt to acquire a supplicant. The quiet period is the period for which the authenticator does not attempt to acquire a supplicant after a failed authentication exchange with the supplicant. The quiet period must be a number in the range of 0 and 65535. A quiet period value of 0 means that the authenticator state machine will never acquire a supplicant. The default value is 60. Changing the value will not change the configuration until the Apply button is pressed.

Transmit Period - This input field allows the user to configure the transmit period for the selected port. The transmit period is the value, in seconds, of the timer used by the authenticator state

machine on the specified port to determine when to send an EAPOL EAP Request/Identity frame to the supplicant. The transmit period must be a number in the range of 1 and 65535. The default value is 30. Changing the value will not change the configuration until the Apply button is pressed.

Supplicant Timeout - This input field allows the user to enter the supplicant timeout for the selected port. The supplicant timeout is the value, in seconds, of the timer used by the authenticator state machine on this port to timeout the supplicant. The supplicant timeout must be a value in the range of 1 and 65535. The default value is 30. Changing the value will not change the configuration until the Apply button is pressed.

Server Timeout - This input field allows the user to enter the server timeout for the selected port. The server timeout is the value, in seconds, of the timer used by the authenticator on this port to timeout the authentication server. The server timeout must be a value in the range of 1 and 65535. The default value is 30. Changing the value will not change the configuration until the Apply button is pressed.

Maximum Requests - This input field allows the user to enter the maximum requests for the selected port. The maximum requests value is the maximum number of times the authenticator state machine on this port will retransmit an EAPOL EAP Request/Identity before timing out the supplicant. The maximum requests value must be in the range of 1 and 10. The default value is 2. Changing the value will not change the configuration until the Apply button is pressed.

Reauthentication Period - This input field allows the user to enter the reauthentication period for the selected port. The reauthentication period is the value, in seconds, of the timer used by the authenticator state machine on this port to determine when reauthentication of the supplicant takes place. The reauthentication period must be a value in the range of 1 and 65535. The default value is 3600. Changing the value will not change the configuration until the Apply button is pressed.

Command Buttons

Initialize - This button begins the initialization sequence on the selected port. This button is only selectable if the control mode is 'auto'. If the button is not selectable, it will be grayed out. Once this button is pressed, the action is immediate. It is not required to press the Apply button for the action to occur.

Reauthenticate - This button begins the reauthentication sequence on the selected port. This button is only selectable if the control mode is 'auto'. If the button is not selectable, it will be grayed out. Once this button is pressed, the action is immediate. It is not required to press the Apply button for the action to occur.

Apply - Send the updated screen to the IBP and cause the changes to take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

Refresh - Update the information on the page.

8.4.1.3 Port Status

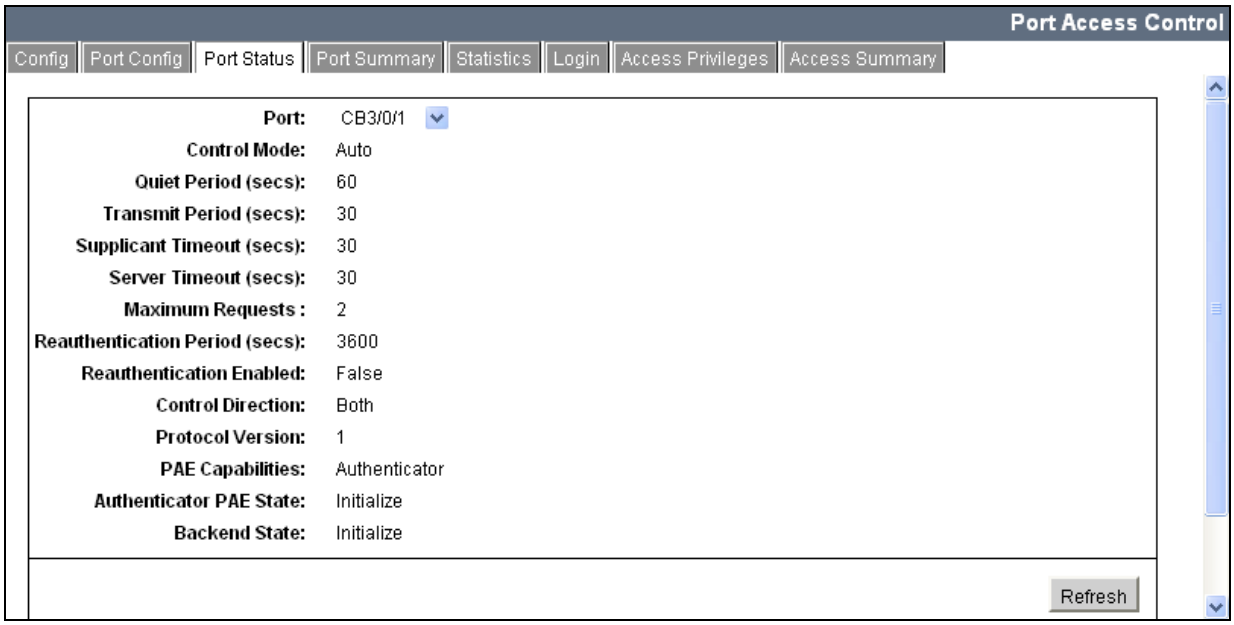

Figure : Port Access Control Port Status

Selection Criteria

Port - Selects the port to be displayed. When the selection is changed, a screen refresh will occur causing all fields to be updated for the newly selected port. All physical interfaces are valid.

Non-Configurable Data

Control Mode - Displays the configured control mode for the specified port. Options are:

- force unauthorized: The authenticator port access entity (PAE) unconditionally sets the controlled port to unauthorized
- force authorized: The authenticator PAE unconditionally sets the controlled port to authorized.
- auto: The authenticator PAE sets the controlled port mode to reflect the outcome of the authentication exchanges between the supplicant, authenticator, and the authentication server.

Quiet Period - This field displays the configured quiet period for the selected port. This quiet period is the value, in seconds, of the timer used by the authenticator state machine on this port to define periods of time in which it will not attempt to acquire a supplicant. The quiet period is the period for which the authenticator does not attempt to acquire a supplicant after a failed authentication exchange with the supplicant. The quiet period is a number in the range of 0 and 65535.

Transmit Period - This field displays the configured transmit period for the selected port. The transmit period is the value, in seconds, of the timer used by the authenticator state machine on the specified port to determine when to send an EAPOL EAP Request/Identity frame to the supplicant. The transmit period is a number in the range of 1 and 65535.

Supplicant Timeout - This field displays the configured supplicant timeout for the selected port. The supplicant timeout is the value, in seconds, of the timer used by the authenticator state machine on this port to timeout the supplicant. The supplicant timeout is a value in the range of 1 and 65535.

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Server Timeout - This field displays the configured server timeout for the selected port. The server timeout is the value, in seconds, of the timer used by the authenticator on this port to timeout the authentication server. The server timeout is a value in the range of 1 and 65535.

Maximum Requests - This field displays the configured maximum requests for the selected port. The maximum requests value is the maximum number of times the authenticator state machine on this port will retransmit an EAPOL EAP Request/Identity before timing out the supplicant. The maximum requests value is in the range of 1 and 10.

Reauthentication Period - This field displays the configured reauthentication period for the selected port. The reauthentication period is the value, in seconds, of the timer used by the authenticator state machine on this port to determine when reauthentication of the supplicant takes place. The reauthentication period is a value in the range of 1 and 65535.

Reauthentication Enabled - This field displays if reauthentication is enabled on the selected port. This is a configurable field. The possible values are 'true' and 'false'. If the value is 'true' reauthentication will occur. Otherwise, reauthentication will not be allowed.

Control Direction - This displays the control direction for the specified port. The control direction dictates the degree to which protocol exchanges take place between Supplicant and Authenticator. This affects whether the unauthorized controlled port exerts control over communication in both directions (disabling both incoming and outgoing frames) or just in the incoming direction (disabling only the reception of incoming frames). This field is not configurable on some platforms.

Protocol Version - This field displays the protocol version associated with the selected port. The only possible value is 1, corresponding to the first version of the 802.1x specification. This field is not configurable.

PAE Capabilities - This field displays the port access entity (PAE) functionality of the selected port. Possible values are "Authenticator" or "Supplicant". This field is not configurable.

Authenticator PAE State - This field displays the current state of the authenticator PAE state machine. Possible values are:

- "Initialize"
- "Disconnected"
- "Connecting"
- "Authenticating"
- "Authenticated"
- "Aborting"
- "Held"
- "ForceAuthorized"
- "ForceUnauthorized".

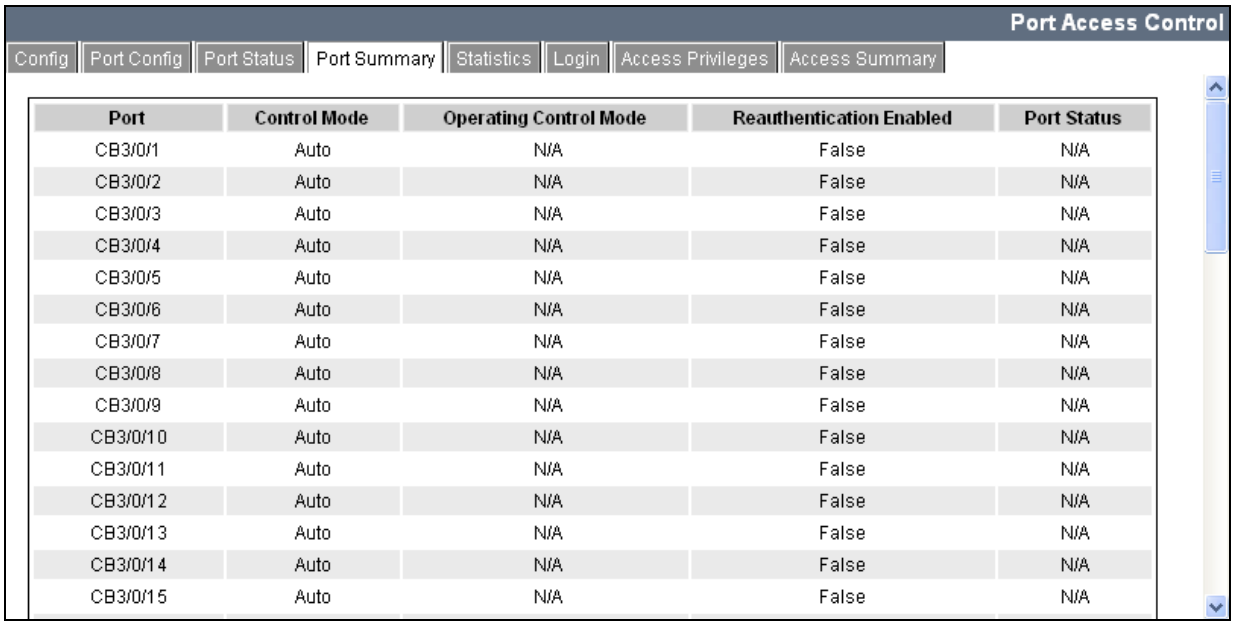
Backend Authentication State - This field displays the current state of the backend authentication state machine. Possible values are:

- "Request"
- "Response"
- "Success"
- "Fail"
- "Timeout"
- "Initialize"
- "Idle"

Command Buttons

Refresh - Update the information on the page.

8.4.1.4 Port Summary



Port	Control Mode	Operating Control Mode	Reauthentication Enabled	Port Status
CB3/0/1	Auto	N/A	False	N/A
CB3/0/2	Auto	N/A	False	N/A
CB3/0/3	Auto	N/A	False	N/A
CB3/0/4	Auto	N/A	False	N/A
CB3/0/5	Auto	N/A	False	N/A
CB3/0/6	Auto	N/A	False	N/A
CB3/0/7	Auto	N/A	False	N/A
CB3/0/8	Auto	N/A	False	N/A
CB3/0/9	Auto	N/A	False	N/A
CB3/0/10	Auto	N/A	False	N/A
CB3/0/11	Auto	N/A	False	N/A
CB3/0/12	Auto	N/A	False	N/A
CB3/0/13	Auto	N/A	False	N/A
CB3/0/14	Auto	N/A	False	N/A
CB3/0/15	Auto	N/A	False	N/A

Figure : Port Access Control Port Summary

Non-Configurable Data

Port - Specifies the port whose settings are displayed in the current table row.

Control Mode - This field indicates the configured control mode for the port. Possible values are:

- Force Unauthorized: The authenticator port access entity (PAE) unconditionally sets the controlled port to unauthorized
- Force Authorized: The authenticator PAE unconditionally sets the controlled port to authorized.
- Auto: The authenticator PAE sets the controlled port mode to reflect the outcome of the authentication exchanges between the supplicant, authenticator, and the authentication server.

Operating Control Mode - This field indicates the control mode under which the port is actually operating. Possible values are:

- ForceUnauthorized
- ForceAuthorized
- Auto
- N/A: If the port is in detached state it cannot participate in port access control.

Reauthentication Enabled - This field shows whether reauthentication of the supplicant for the specified port is allowed. The possible values are 'true' and 'false'. If the value is 'true' reauthentication will occur. Otherwise, reauthentication will not be allowed.

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Port Status - This field shows the authorization status of the specified port. The possible values are 'Authorized', 'Unauthorized' and 'N/A'. If the port is in detached state, the value will be 'N/A' since the port cannot participate in port access control.

Command Buttons

Refresh - Update the information on the page.

8.4.1.5 Statistics

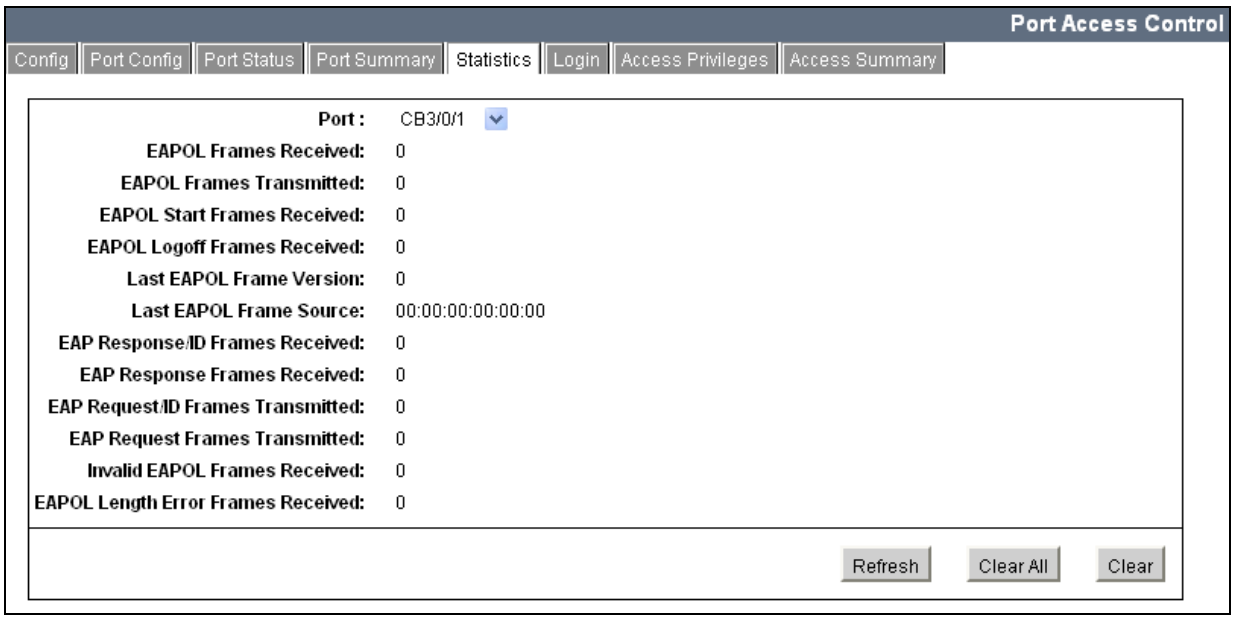

Figure : Port Access Control Statistics

Selection Criteria

Port - Selects the port to be displayed. When the selection is changed, a screen refresh will occur causing all fields to be updated for the newly selected port. All physical interfaces are valid.

Non-Configurable Data

EAPOL Frames Received - This displays the number of valid EAPOL frames of any type that have been received by this authenticator.

EAPOL Frames Transmitted - This displays the number of EAPOL frames of any type that have been transmitted by this authenticator.

EAPOL Start Frames Received - This displays the number of EAPOL start frames that have been received by this authenticator.

EAPOL Logoff Frames Received - This displays the number of EAPOL logoff frames that have been received by this authenticator.

Last EAPOL Frame Version - This displays the protocol version number carried in the most recently received EAPOL frame.

Last EAPOL Frame Source - This displays the source MAC address carried in the most recently received EAPOL frame.

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EAP Response/Id Frames Received - This displays the number of EAP response/identity frames that have been received by this authenticator.

EAP Response Frames Received - This displays the number of valid EAP response frames (other than resp/id frames) that have been received by this authenticator.

EAP Request/Id Frames Transmitted - This displays the number of EAP request/identity frames that have been transmitted by this authenticator.

EAP Request Frames Transmitted - This displays the number of EAP request frames (other than request/identity frames) that have been transmitted by this authenticator.

Invalid EAPOL Frames Received - This displays the number of EAPOL frames that have been received by this authenticator in which the frame type is not recognized.

EAP Length Error Frames Received - This displays the number of EAPOL frames that have been received by this authenticator in which the frame type is not recognized.

Command Buttons

Refresh - Update the information on the page.

Clear All - This button resets all statistics for all ports to 0. There is no confirmation prompt. When this button is pressed, the stats are immediately cleared.

Clear - This button resets the statistics for the selected port. There is no confirmation prompt. When this button is pressed, the stats are immediately cleared.

8.4.1.6 Login

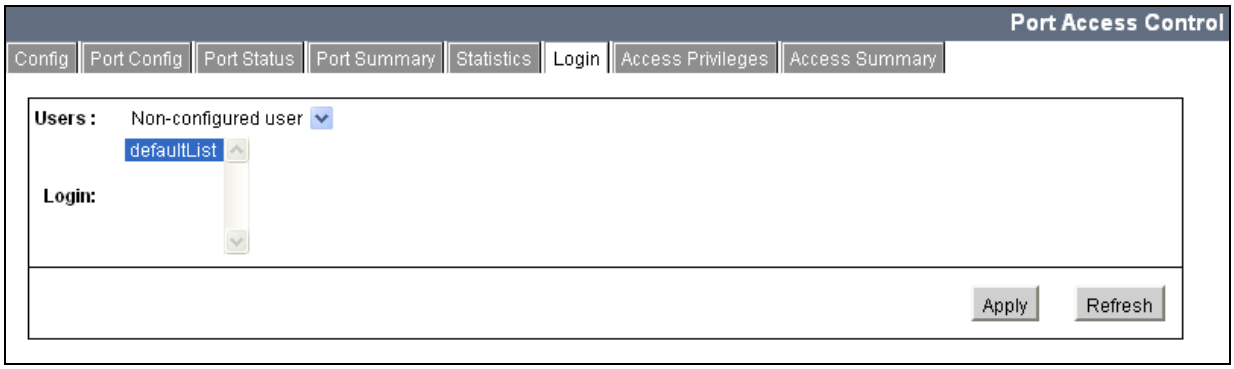

Figure : Port Access Control Login

Selection Criteria

Users - Selects the user name that will use the selected login list for 802.1x port security.

Configurable Data

Login - Selects the login to apply to the specified user. All configured logins are displayed.

Command Buttons

Apply - Send the updated screen to the IBP and cause the changes to take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

Refresh - Update the information on the page.

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8.4.1.7 Access Privileges

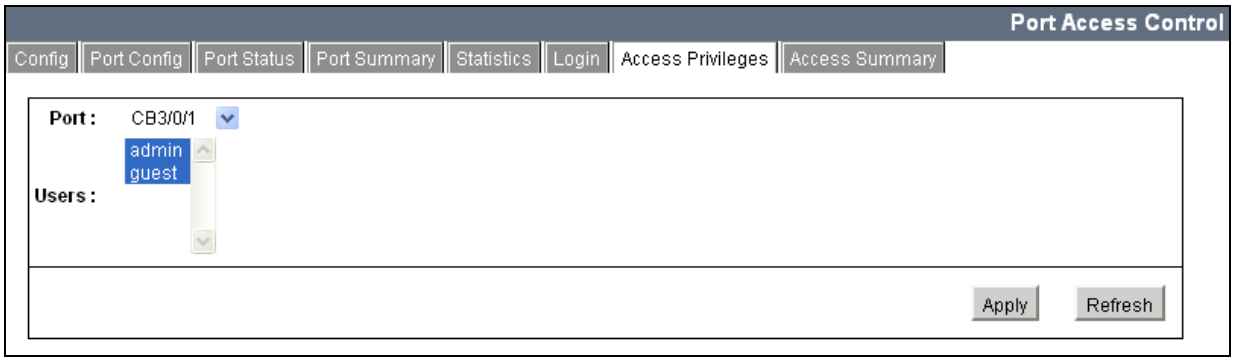

Figure : Port Access Control Access Privileges

Selection Criteria

Port - Selects the port to configure.

Configurable Data

Users - Selects the users that have access to the specified port or ports.

Command Buttons

Apply - Send the updated screen to the IBP and cause the changes to take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

Refresh - Update the information on the page.

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8.4.1.8 Access Summary

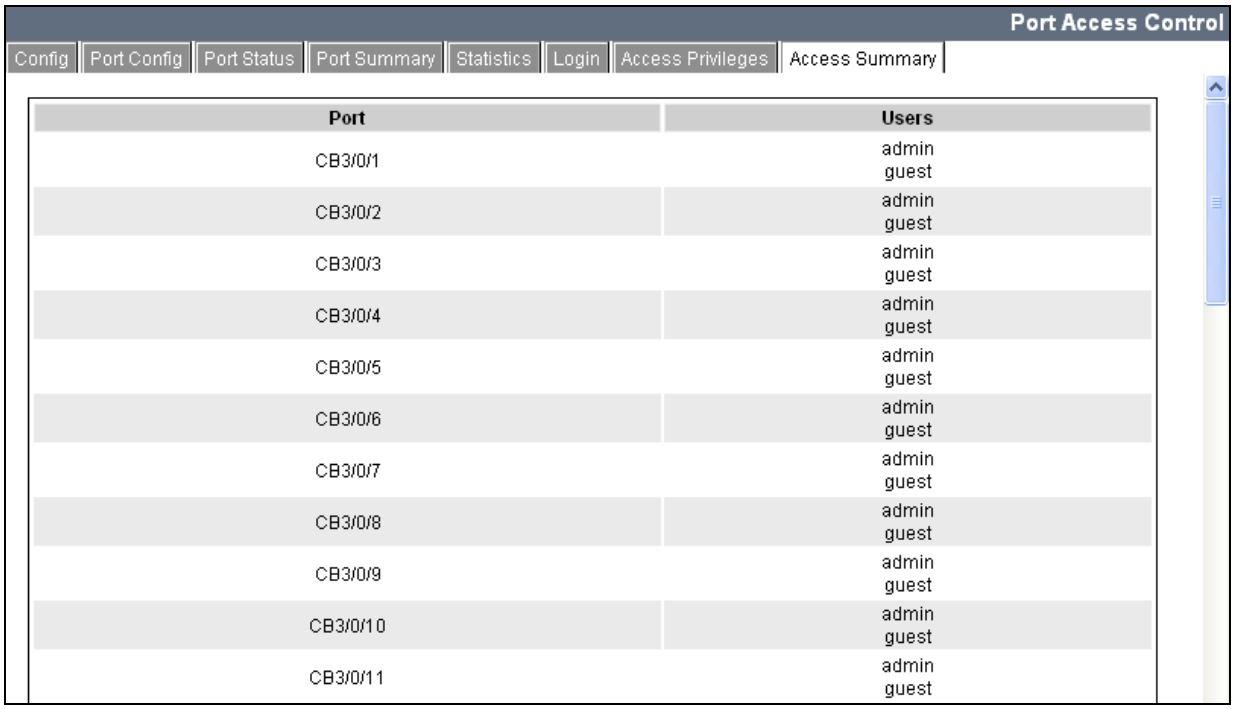

Figure : Port Access Control Access Summary

Non-Configurable Data

Port - Displays the port in Unit/Slot/Port format.

Users - Displays the users that have access to the port.

Command Buttons

Refresh - Update the information on the page.

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8.4.2 Port Security

8.4.2.1 Config

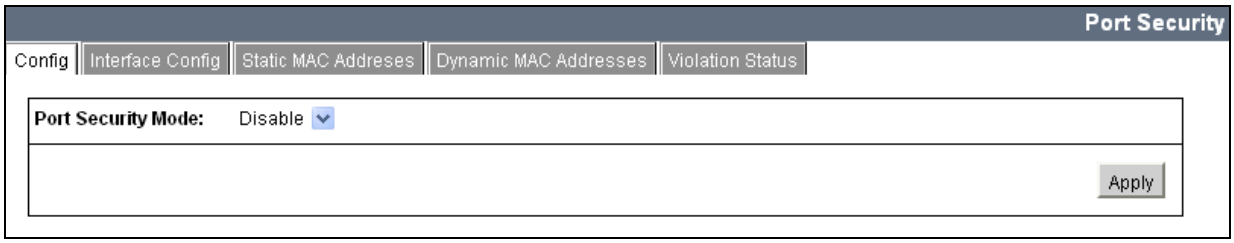

Figure : Port Security Config

Configurable Data

Port Security Mode - Enables or disables the Port Security feature.

Command Buttons

Apply - Applies the new configuration and causes the changes to take effect. These changes will not be retained across a power cycle unless a save configuration is performed.

8.4.2.2 Interface Config

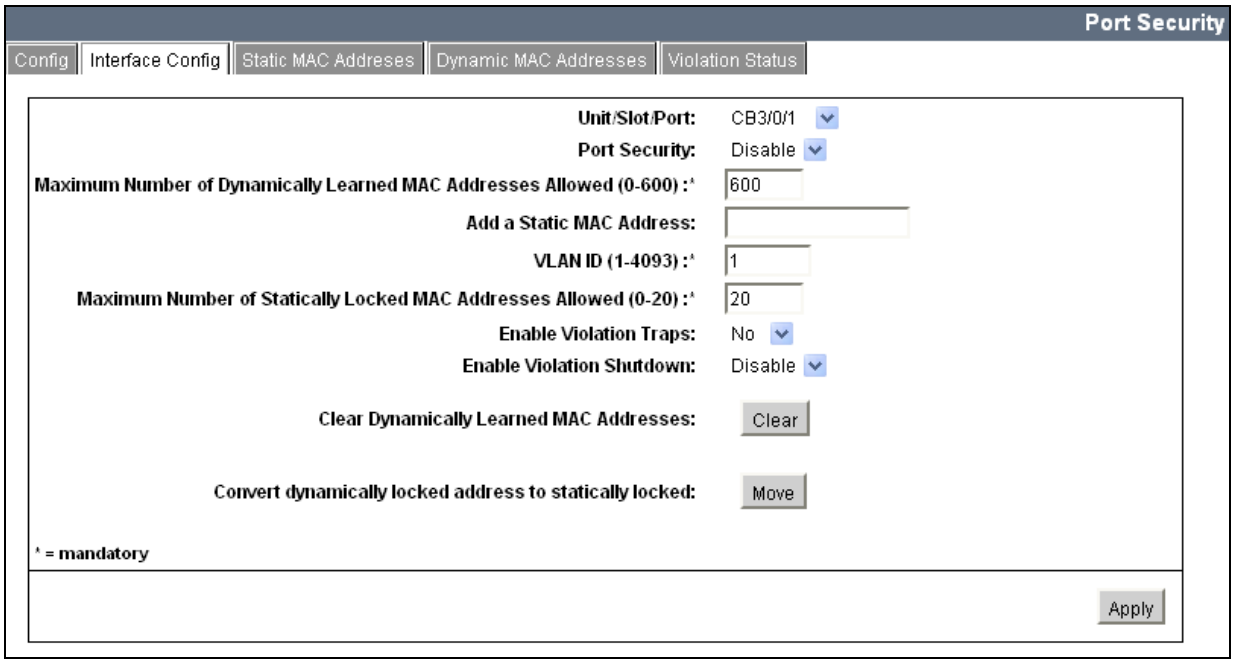

Figure : Port Security Interface Config

Selection Criteria

Unit/Slot/Port - Selects the interface to be configured.

Port Security - Enables or disables the Port Security feature for the selected interface.

Enable Violation Traps - Enables or disables the sending of new violation traps designating when a packet with a disallowed MAC address is received on a locked port.

Enable Violation Shutdown - Enables or disables the Port Security Violation Shutdown mode for the selected interface.

Configurable Data

Maximum Number of Dynamically Learned MAC Addresses Allowed - Sets the maximum number of dynamically learned MAC addresses on the selected interface.

Add a Static MAC Address - Adds a MAC address to the list of statically locked MAC addresses for the selected interface.

VLAN ID - Adds a corresponding VLAN ID for the MAC Address being added to the list of statically locked MAC addresses for the selected interface.

Maximum Number of Statically Locked MAC Addresses Allowed - Sets the maximum number of statically locked MAC addresses on the selected interface.

Command Buttons

Clear - Clears the Dynamic MAC addresses of the selected interface.

Move - Converts a dynamically learned MAC address to a statically locked address. The Dynamic MAC address entries are converted to Static MAC address entries in a numerically ascending order until the Static limit is reached.

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Apply - Applies the new configuration and causes the changes to take effect. These changes will not be retained across a power cycle unless a save configuration is performed.

8.4.2.3 Static MAC Addresses

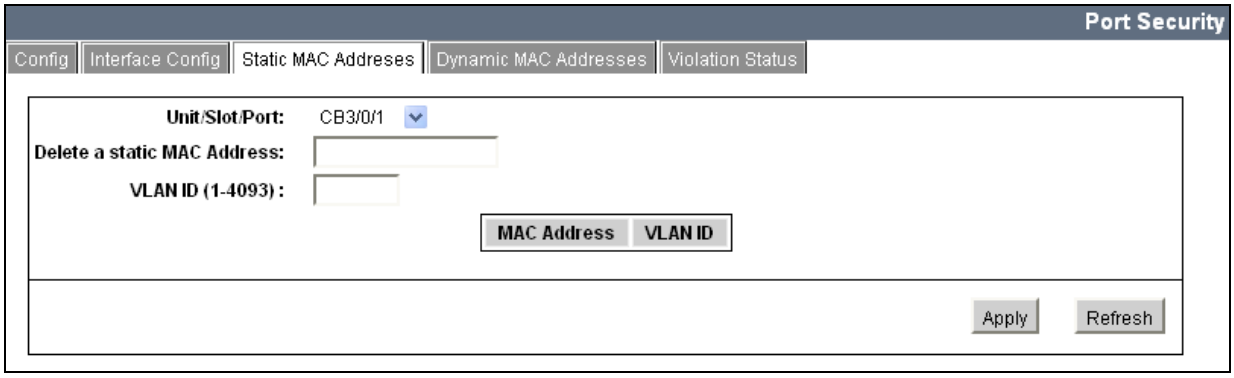

Figure : Port Security Static MAC Addresses

Selection Criteria

Slot/Port - Select the physical interface for which you want to display data.

Configurable Data

Delete a static MAC Address - Accepts user input for the MAC address to be deleted.

VLAN ID - Accepts user input for the VLAN ID corresponding to the MAC address being deleted.

Non-configurable data

MAC Address - Displays the user specified statically locked MAC address.

VLAN ID - Displays the VLAN ID corresponding to the MAC address.

Command Buttons

Apply - Applies the new configuration and causes the changes to take effect. These changes will not be retained across a power cycle unless a save configuration is performed.

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8.4.2.4 Dynamic MAC Addresses

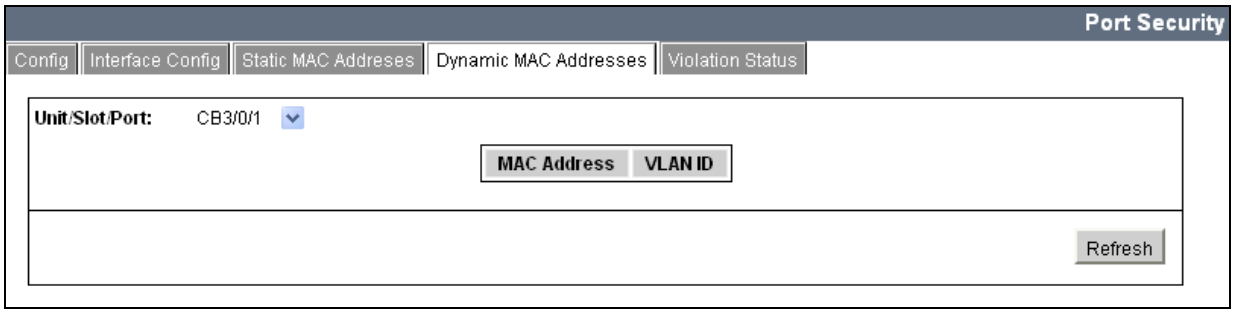

Figure : Port Security Dynamic MAC Addresses

Selection Criteria

Unit/Slot/Port - Select the physical interface for which you want to display data.

Non-configurable data

MAC Address - Displays the MAC addresses learned on a specific port.

VLAN ID - Displays the VLAN ID corresponding to the MAC address.

Number of Dynamic MAC addresses learned - Displays the number of dynamically learned MAC addresses on a specific port.

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8.4.2.5 Violation Status

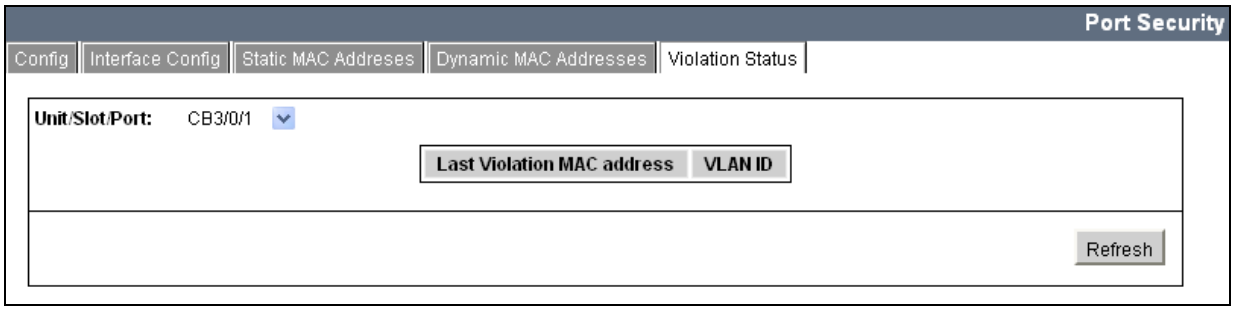

Figure : Port Security Dynamic Violation Status

Selection Criteria

Unit/Slot/Port - Select the physical interface for which you want to display data.

Non-configurable data

Last Violation MAC Address - Displays the source MAC address of the last packet that was discarded at a locked port.

VLAN ID - Displays the VLAN ID corresponding to the Last Violation MAC address.

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8.4.3 RADIUS Configuration

8.4.3.1 Config

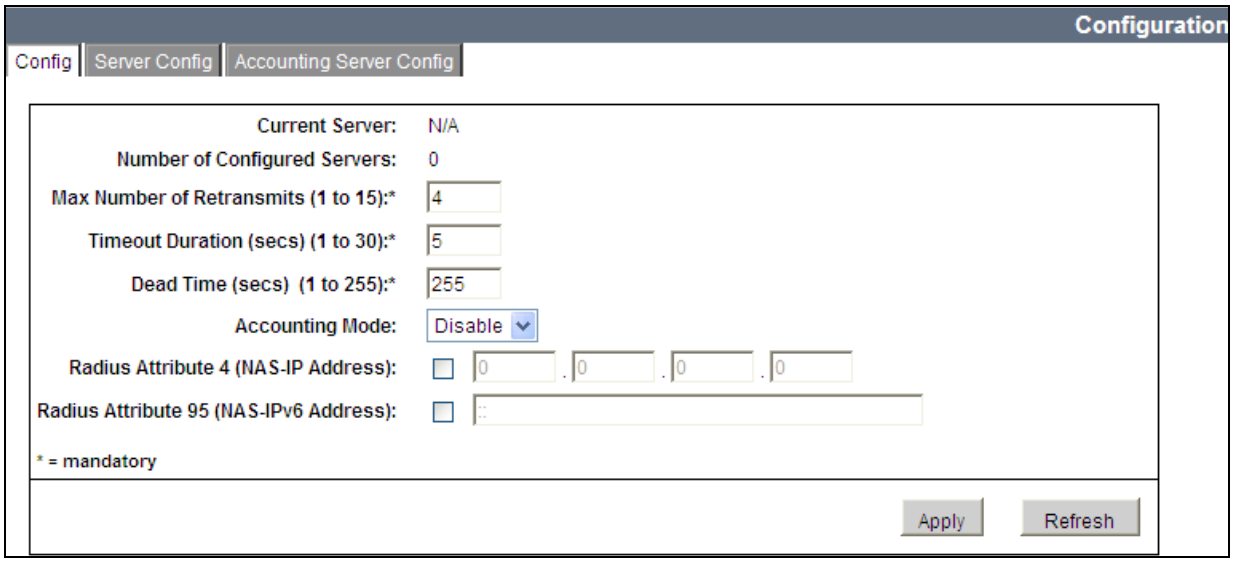

Figure : RADIUS Config

Selection Criteria

Accounting Mode - Selects if the RADIUS accounting mode is enabled or disabled.

Configurable Data

Max Number of Retransmits - The value of the maximum number of times a request packet is retransmitted. The valid range is 1 - 15. Consideration to maximum delay time should be given when configuring RADIUS maxretransmit and RADIUS timeout. If multiple RADIUS servers are configured, the max retransmit value on each will be exhausted before the next server is attempted. A retransmit will not occur until the configured timeout value on that server has passed without a response from the RADIUS server. Therefore, the maximum delay in receiving a response from the RADIUS application equals the sum of (retransmit times timeout) for all configured servers. If the RADIUS request was generated by a user login attempt, all user interfaces will be blocked until the RADIUS application returns a response.

Timeout Duration (secs) - The timeout value, in seconds, for request retransmissions. The valid range is 1 - 30. Consideration to maximum delay time should be given when configuring RADIUS maxretransmit and RADIUS timeout. If multiple RADIUS servers are configured, the max retransmit value on each will be exhausted before the next server is attempted. A retransmit will not occur until the configured timeout value on that server has passed without a response from the RADIUS server. Therefore, the maximum delay in receiving a response from the RADIUS application equals the sum of (retransmit times timeout) for all configured servers. If the RADIUS request was generated by a user login attempt, all user interfaces will be blocked until the RADIUS application returns a response.

Dead Time – The dead time value, in seconds. The valid range is 1 – 255.

Radius Attribute 4 (NAS-IP Address) - Select if the Radius Attribute 4 (NAS-IP Address) inclusion in Radius Requests is enabled or disabled. Mention explicitly the IP address to be sent as NAS-IP

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Address to the Radius servers. If not mentioned, then the outgoing interface IP address that is used to send the packet to the Radius server is added as NAS-IP Address.

Radius Attribute 95 (NAS-IPv6 Address) - Select if the Radius Attribute 95 (NAS-IPv6 Address) inclusion in Radius Requests is enabled or disabled. Mention explicitly the IPv6 address to be sent as NAS-IPv6 Address to the Radius servers. If not mentioned, then the outgoing interface IPv6 address that is used to send the packet to the Radius server is added as NAS-IPv6 Address.

Non-Configurable Data

Current Server - The IP address or host name of the current server. This field is blank if no servers are configured.

Number of Configured Servers - - The number of RADIUS servers that have been configured. This value will be in the range of 0 and 3.

Command Buttons

Apply - Send the updated screen to the IBP and cause the changes to take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

Refresh - Update the information on the page.

8.4.3.2 Server Config

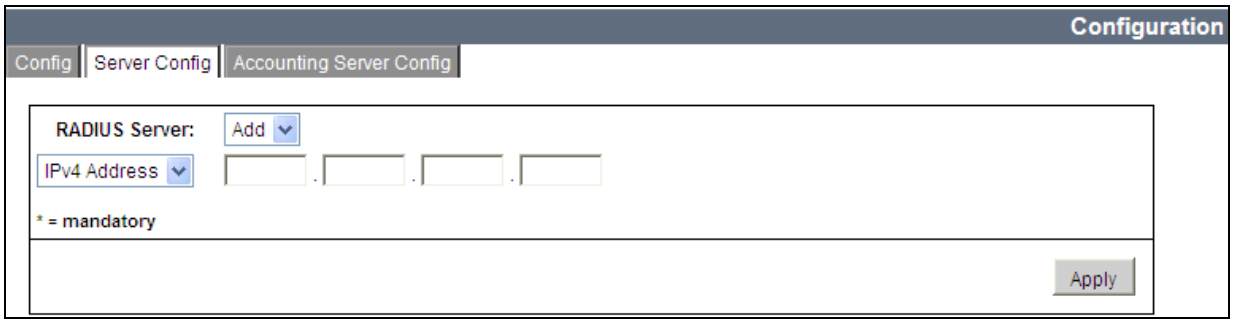

Figure : RADIUS Server Config

Selection Criteria

RADIUS Server - Selects the RADIUS server to be configured. Select add to add a server in type of IPv4/IPv6 Address or Host Name.

Primary Server - Sets the selected server to the Primary or Secondary server.

Message Authenticator - Enable or disable the message authenticator attribute for the selected server.

Configurable Data

IPv4 Address - - The IPv4 address of the server being added.
You cannot define these IPv4 addresses:

- 0.0.0.0
- 255.255.255.255
- 224.xxx.xxx.xxx
- 127.0.0.1

IPv6 Address - - The IPv6 address of the server being added.
You cannot define these IPv6 addresses:

- 0::0 (Unspecified)
- 0::1 (Loopback)
- Multicast

Host Name -The host name of the server being added.

Port - The UDP port used by this server. The valid range is 0 - 65535.

Secret - The shared secret for this server. This is an input field only.

Apply - The Secret will only be applied if this box is checked. If the box is not checked, anything entered in the Secret field will have no affect and will not be retained. This field is only displayed if the user has READWRITE access.

Encrypted - When the secret string is encrypted, this box need to be checked. This field is only displayed if the user has READWRITE access.

Non-Configurable Data

Current - Indicates if this server is currently in use as the authentication server.

Secret Configured - Indicates if the shared secret for this server has been configured.

Command Buttons

Apply - Send the updated screen to the IBP and cause the changes to take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

Remove - Remove the selected server from the configuration. This button is only available to READWRITE users. These changes will not be retained across a power cycle unless a save is performed.

Refresh - Update the information on the page.

8.4.3.3 Accounting Server Config

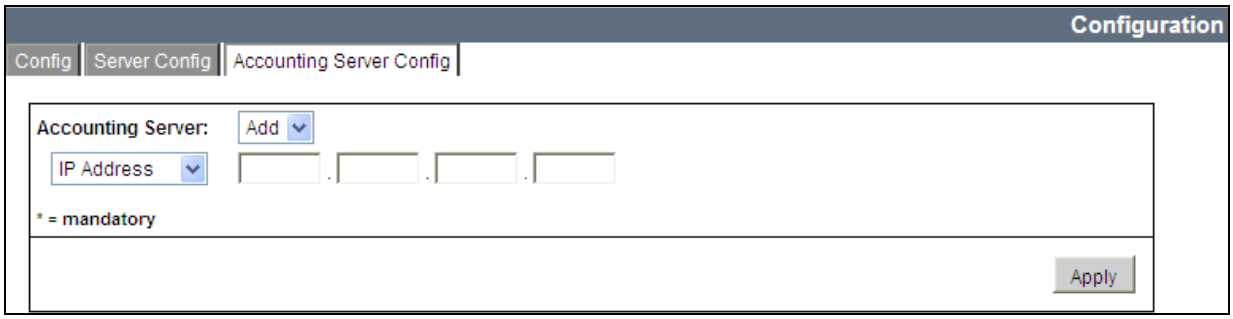

Figure : RADIUS Accounting Server Config

Selection Criteria

Accounting Server - Selects the accounting server for which data is to be displayed or configured. If the add item is selected, a new accounting server can be configured.

Configurable Data

IP Address - The IPv4 address of the accounting server to add. This field is only configurable if the add item is selected.
You cannot define these IPv4 addresses:

- 0.0.0.0
- 255.255.255.255
- 224.xxx.xxx.xxx
- 127.0.0.1

IPv6 Address - - The IPv6 address of the server being added.
You cannot define these IPv6 addresses:

- 0::0 (Unspecified)
- 0::1 (Loopback)
- Multicast

Host Name -The host name of the server being added.

Port - Specifies the UDP Port to be used by the accounting server. The valid range is 0 - 65535. If the user has READONLY access, the value is displayed but cannot be changed.

Secret - Specifies the shared secret to use with the specified accounting server. This field is only displayed if the user has READWRITE access.

Apply - The Secret will only be applied if this box is checked. If the box is not checked, anything entered in the Secret field will have no affect and will not be retained. This field is only displayed if the user has READWRITE access.

Encrypted - When the secret string is encrypted, this box need to be checked. This field is only displayed if the user has READWRITE access.

Non-Configurable Data

Secret Configured - Indicates if the secret has been configured for this accounting server.

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Command Buttons

Apply - Send the updated screen to the IBP and cause the changes to take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

Remove - Remove the selected accounting server from the configuration. This button is only available to READWRITE users. These changes will not be retained across a power cycle unless a save is performed.

Refresh - Update the information on the page.

8.4.4 RADIUS Statistics

8.4.4.1 Radius Statistics

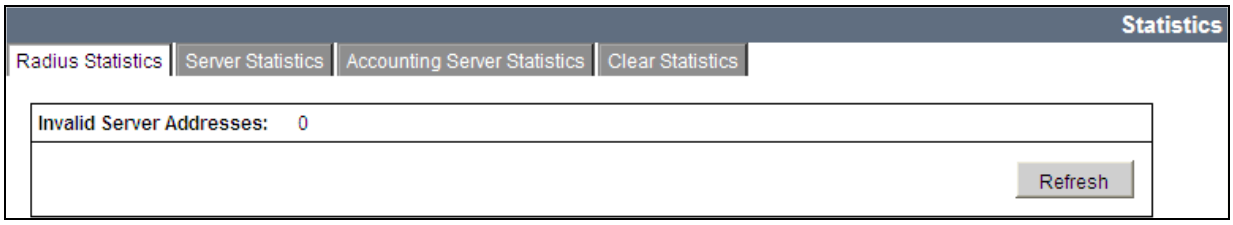

Figure : Radius Statistics

Non-Configurable Data

Invalid Server Addresses - The number of RADIUS Access-Response packets received from unknown addresses.

Command Buttons

Refresh - Update the information on the page.

8.4.4.2 Server Statistics

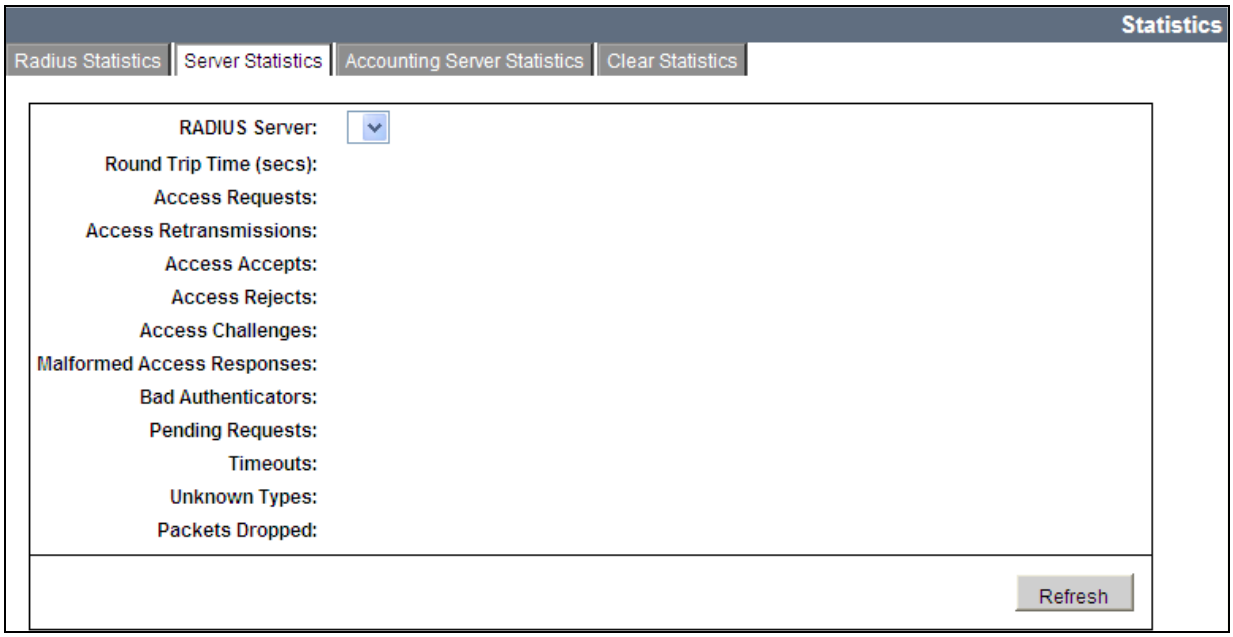

Figure : Radius Server Statistics

Selection Criteria

RADIUS Server - Selects the IPv4/IPv6 address or host name of the RADIUS server for which to display statistics.

Non-Configurable Data

Round Trip Time (secs) - The time interval, in hundredths of a second, between the most recent Access-Reply/Access-Challenge and the Access-Request that matched it from this RADIUS authentication server.

Access Requests - - The number of RADIUS Access-Request packets sent to this server. This number does not include retransmissions.

Access Retransmissions - - The number of RADIUS Access-Request packets retransmitted to this server.

Access Accepts - - The number of RADIUS Access-Accept packets, including both valid and invalid packets, that were received from this server.

Access Rejects - - The number of RADIUS Access-Reject packets, including both valid and invalid packets, that were received from this server.

Access Challenges - - The number of RADIUS Access-Challenge packets, including both valid and invalid packets, that were received from this server.

Malformed Access Responses - - The number of malformed RADIUS Access-Response packets received from this server. Malformed packets include packets with an invalid length. Bad authenticators or signature attributes or unknown types are not included as malformed access-responses.

Bad Authenticators - - The number of RADIUS Access-Response packets containing invalid authenticators or signature attributes received from this server.

Pending Requests - - The number of RADIUS Access-Request packets destined for this server that have not yet timed out or received a response.

Timeouts - - The number of authentication timeouts to this server.

Unknown Types - - The number of RADIUS packets of unknown type which were received from this server on the authentication port.

Packets Dropped - - The number of RADIUS packets received from this server on the authentication port and dropped for some other reason.

Command Buttons

Refresh - Update the information on the page.

8.4.4.3 Accounting Server Statistics

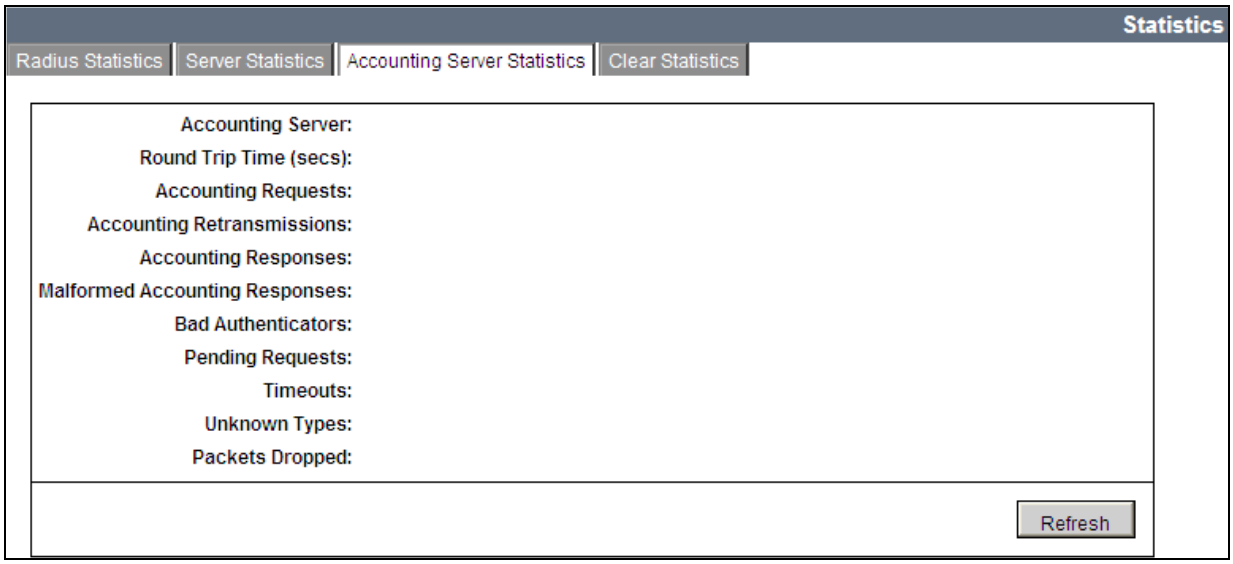

Figure : Radius Accounting Server Statistics

Non-Configurable Statistics

Accounting Server - Identifies the accounting server associated with the statistics.

Round Trip Time (secs) - Displays the time interval, in hundredths of a second, between the most recent Accounting-Response and the Accounting-Request that matched it from this RADIUS accounting server.

Accounting Requests - Displays the number of RADIUS Accounting-Request packets sent not including retransmissions.

Accounting Retransmissions - Displays the number of RADIUS Accounting-Request packets retransmitted to this RADIUS accounting server.

Accounting Responses - Displays the number of RADIUS packets received on the accounting port from this server.

Malformed Accounting Responses - Displays the number of malformed RADIUS Accounting-Response packets received from this server. Malformed packets include packets with an invalid length. Bad authenticators and unknown types are not included as malformed accounting responses.

Bad Authenticators - Displays the number of RADIUS Accounting-Response packets that contained invalid authenticators received from this accounting server.

Pending Requests - Displays the number of RADIUS Accounting-Request packets sent to this server that have not yet timed out or received a response.

Timeouts - Displays the number of accounting timeouts to this server.

Unknown Types - Displays the number of RADIUS packets of unknown type that were received from this server on the accounting port.

Packets Dropped - Displays the number of RADIUS packets that were received from this server on the accounting port and dropped for some other reason.

Command Buttons

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Refresh - Update the information on the page.

8.4.4.4 Clear Statistics

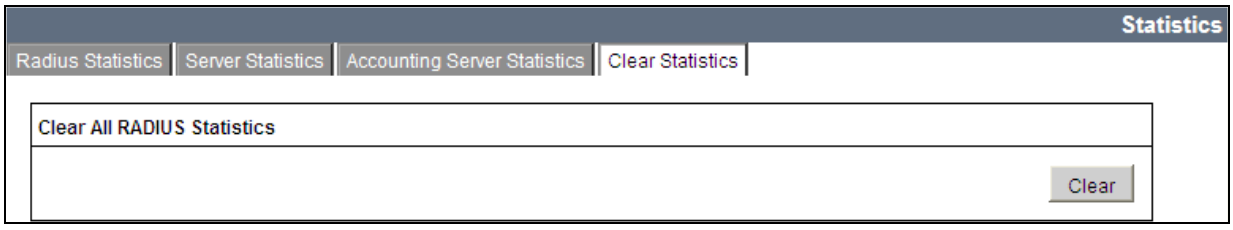

Figure : Radius Clear Statistics

Command Buttons

Clear All RADIUS Statistics - This button will clear the accounting server, authentication server and RADIUS statistics.

8.4.5 TACACS+

8.4.5.1 Config

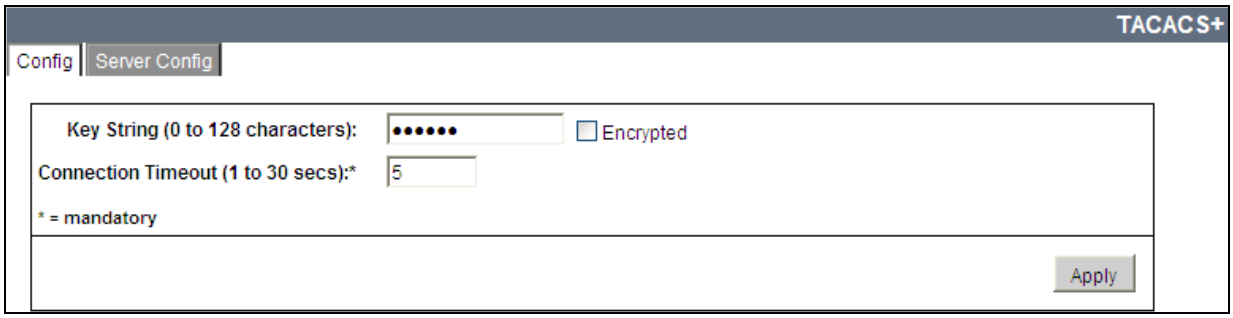

Figure : TACACS+ Config

Configurable Data

Key String - Specifies the authentication and encryption key for TACACS+ communications between the device and the TACACS+ server. The valid range is 0-128 characters. The key must match the key configured on the TACACS+ server.

Encrypted - When the key string is encrypted, this box need to be checked. This field is only displayed if the user has READWRITE access.

Connection Timeout - The maximum number of seconds allowed to establish a TCP connection between the device and the TACACS+ server.

Command Buttons

Apply - Send the updated screen to the IBP and cause the changes to take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

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8.4.5.2 Server Config

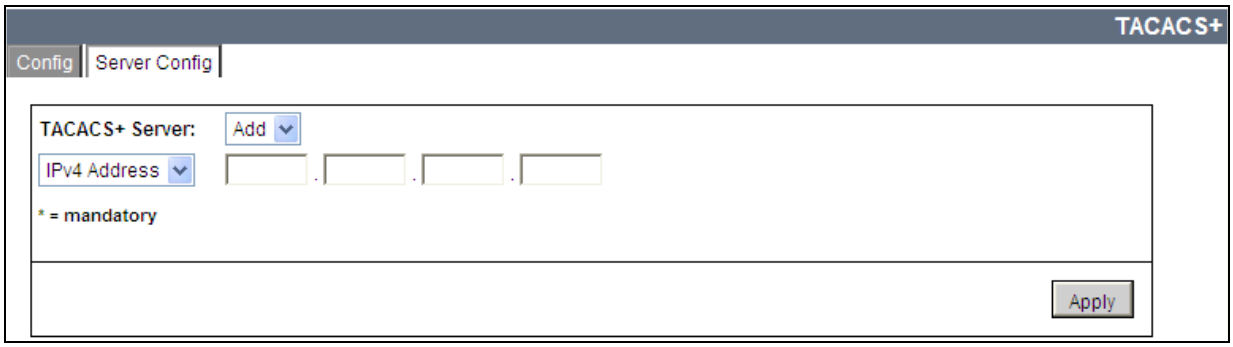

Figure : TACACS+ Server Config

Selection Criteria

TACACS+ Server - Selects the TACACS+ server for which data is to be displayed or configured. If the add item is selected, a new TACACS server can be configured.

Configurable Data

IPv4 Address - Specifies the TACACS+ Server IPv4 address.
You cannot define these IPv4 addresses:

- 0.0.0.0
- 255.255.255.255
- 224.xxx.xxx.xxx
- 127.0.0.1

IPv6 Address - - The IPv6 address of the server being added.
You cannot define these IPv6 addresses:

- 0::0 (Unspecified)
- 0::1 (Loopback)
- Multicast

Host Name -The host name of the server being added.

Priority - Specifies the order in which the TACACS+ servers are used. It should be within the range 0-65535.

Port - Specifies the authentication port. It should be within the range 0-65535.

Key String - Specifies the authentication and encryption key for TACACS+ communications between the device and the TACACS+ server. The valid range is 0-128 characters. The key must match the encryption used on the TACACS+ server.

Encrypted - When the key string is encrypted, this box need to be checked. This field is only displayed if the user has READWRITE access.

Connection Timeout - The amount of time that passes before the connection between the device and the TACACS+ server time out. The range is between 1-30.

Command Buttons

Apply - Send the updated screen to the IBP and cause the changes to take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

Remove - Remove the selected server from the configuration.

8.4.6 LDAP

8.4.6.1 Config

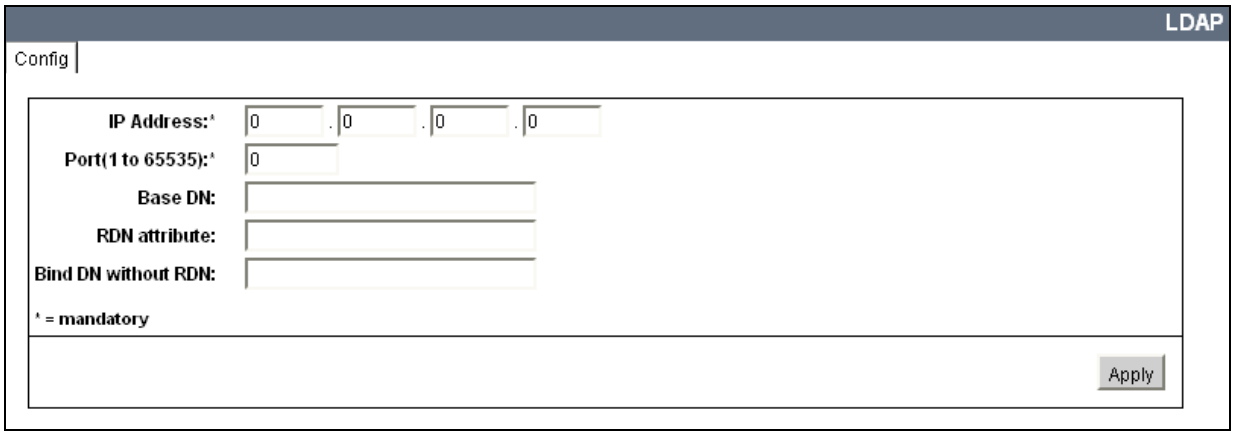

Figure : LDAP Config

Operation

If RDN(Relative Distinguished Name) attribute is "cn"(common name), and bind DN(Distinguished Name) without RDN is "dc=test,dc=com". User name is "root", and password is "1234".Then the bind DN is "cn=root,dc=test,dc=com", and password is "1234". (OU stands for "Organization Unit". DC stands for "Domain Component".)

Configurable Data

IP Address - LDAP server IP, default is 0.0.0.0.

Port - LDAP server TCP port, default is 389.

Base DN - Base distinguished name, default is empty string.

RDN attribute - RDN attribute of bind DN, default is empty string.

Bind DN without RDN - Partial bind DN exclude RDN with it, default is empty string.

Command Buttons

Apply - Update the LDAP configuration with the values you entered. If you want the IBP to retain the new values across a power cycle you must perform a save.

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8.4.7 Access Control Lists

8.4.7.1 IP Config

An IP ACL consists of a set of rules which are matched sequentially against a packet. When a packet meets the match criteria of a rule, the specified rule action (Permit/Deny) is taken and the additional rules are not checked for a match. On this menu the interfaces to which an IP ACL applies must be specified, as well as whether it applies to inbound or outbound traffic. Rules for the IP ACL are specified/created using the IP ACL Rule Configuration menu.

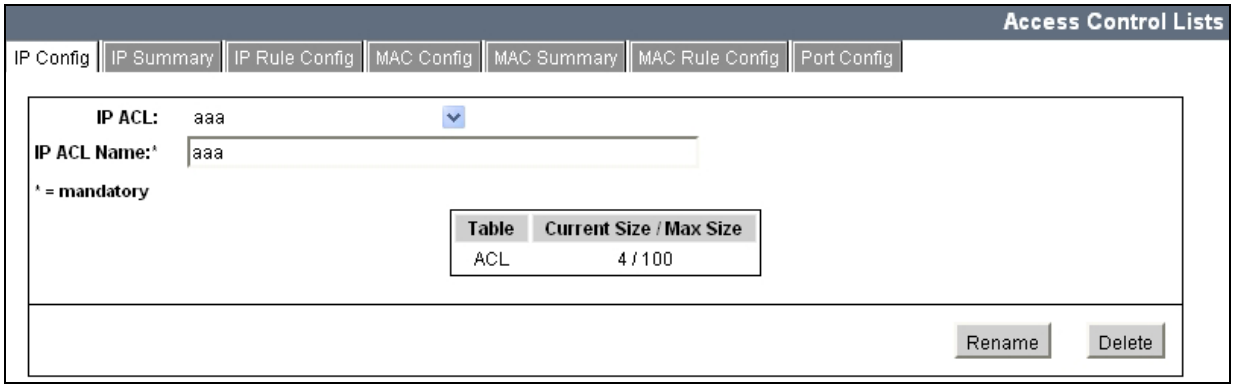

Figure : Access Control Lists IP Config

Selection Criteria

IP ACL - Make a selection from the pull down menu. A new IP Access Control List may be created or the configuration of an existing IP ACL can be updated.

Configurable Data

IP ACL ID - IP ACL ID must be a whole number in the range of 1 to 99 for IP Standard Access Lists and 100 to 199 for IP Extended Access Lists.

IP ACL Name - Specifies IP ACL Name string which includes alphanumeric characters only. The name up to 31 characters in length. The name must start with an alphabetic character. This field displays the name of the currently selected IP ACL if the ACL has already been created.

Non-Configurable Data

Table - Displays the current and maximum number of IP ACLs.

Current Size - The current number of IP ACLs.

Max Size – The maximum number of IP ACLs.

Command Buttons

Apply - Send the updated configuration to the IBP. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

Delete - Removes the currently selected IP ACL from the IBP configuration.

8.4.7.2 IP Summary

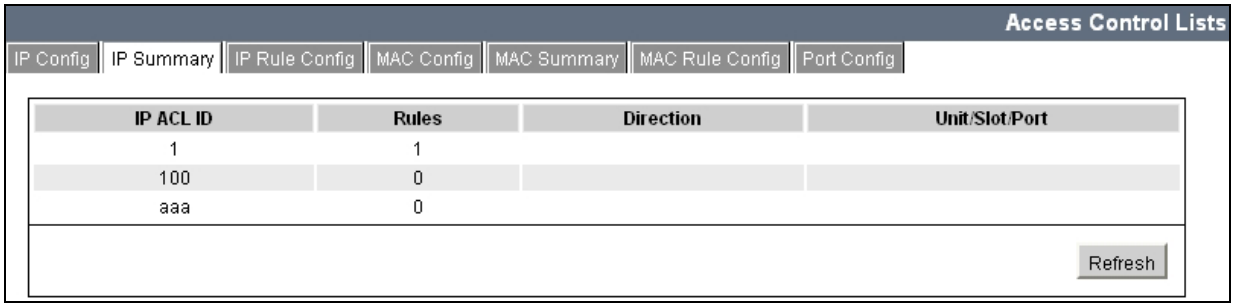

Figure : Access Control Lists IP Summary

Non-Configurable Data

IP ACL ID/Name - The IP ACL identifier.

Rules - The number of rules currently configured for the IP ACL.

Direction - The direction of packet traffic affected by the IP ACL.
Direction can only be one of the following:

- Inbound

Slot/Port(s) - The interfaces to which the IP ACL applies.

Command Buttons

Refresh - Refresh the data on the screen to the latest state.

8.4.7.3 IP Rule Config

Use these screens to configure the rules for the IP Access Control Lists created using the IP Access Control List Configuration screen. What is shown on this screen varies depending on the current step in the rule configuration process. A Standard/Extended/Name IP ACL must first be selected to configure rules for. The rule identification, and the 'Action' and 'Match Every' parameters must be specified next. If 'Match Every' is set to false a new screen will then be presented from which the match criteria can be configured.

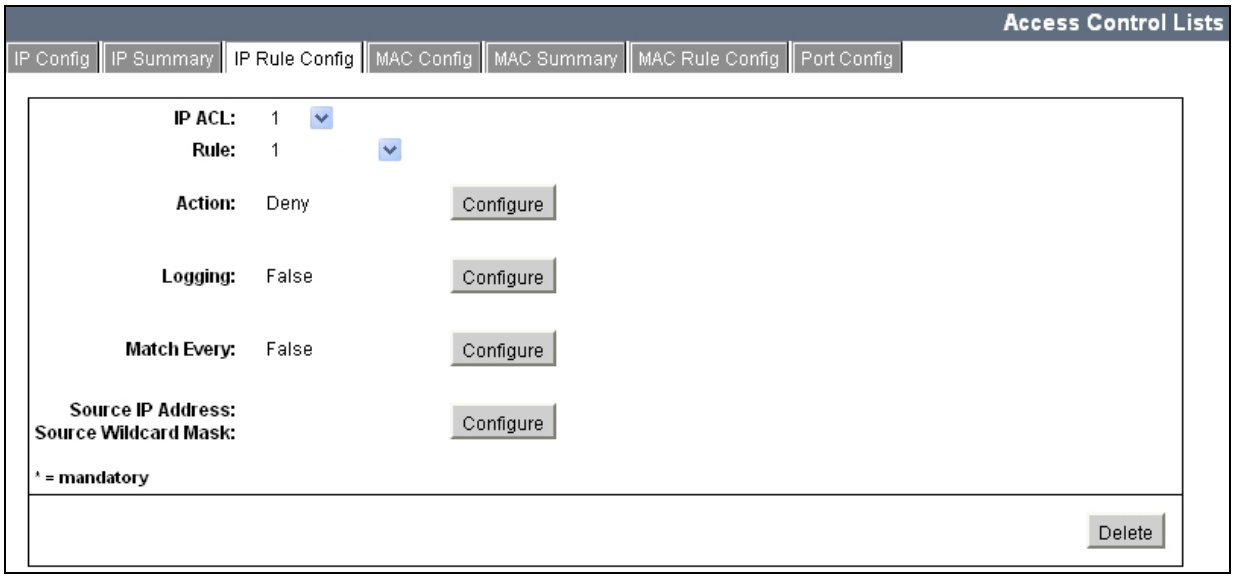

Figure : Access Control Lists IP Rule Config

Selection Criteria

IP ACL - Use the pull down menu to select the IP ACL for which to create or update a rule.

Rule - Select an existing rule from the pull down menu, or select 'Create New Rule.' ACL as well as an option to add a new Rule. New rules cannot be created if the maximum number of rules has been reached. For each rule, a packet must match all the specified criteria in order to be true against that rule and for the specified rule action (Permit/Deny) to take place.

Configurable Data

Rule ID - Enter a whole number in the range of 1 to 10 that will be used to identify the rule. An IP ACL may have up to 10 rules.

Action - Specify what action should be taken if a packet matches the rule's criteria. The choices are permit or deny.

Logging - When set to 'True', logging is enabled for this ACL rule (subject to resource availability in the device). If the Access List Trap Flag is also enabled, this will cause periodic traps to be generated indicating the number of times this rule was 'hit' during the current report interval. A fixed 5 minute report interval is used for the entire system. A trap is not issued if the ACL rule hit count is zero for the current interval. This field is visible for a 'Deny' Action.

Assign Queue ID - Specifies the hardware egress queue identifier used to handle all packets matching this IP ACL rule. Valid range of Queue Ids is (0 to 7). This field is visible for a 'Permit' Action.

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Mirror Interface - Specifies the specific egress interface where the matching traffic stream is copied in addition to being forwarded normally by the device. This field cannot be set if a Redirect Interface is already configured for the ACL rule. This field is visible for a 'Permit' Action.

Redirect Interface - Specifies the specific egress interface where the matching traffic stream is forced, bypassing any forwarding decision normally performed by the device. This field cannot be set if a Mirror Interface is already configured for the ACL rule. This field is visible for a 'Permit' Action.

Match Every - Select true or false from the pull down menu. True signifies that all packets will match the selected IP ACL and Rule and will be either permitted or denied. In this case, since all packets match the rule, the option of configuring other match criteria will not be offered. To configure specific match criteria for the rule, remove the rule and re-create it, or re-configure 'Match Every' to 'False' for the other match criteria to be visible.

Protocol Keyword - Specify that a packet's IP protocol is a match condition for the selected IP ACL rule. The possible values are ICMP, IGMP, IP, TCP, and UDP. Either the 'Protocol Keyword' field or the 'Protocol Number' field can be used to specify an IP protocol value as a match criterion.

Protocol Number - Specify that a packet's IP protocol is a match condition for the selected IP ACL rule and identify the protocol by number. The protocol number is a standard value assigned by IANA and is interpreted as an integer from 1 to 255. Either the 'Protocol Number' field or the 'Protocol Keyword' field can be used to specify an IP protocol value as a match criterion.

Source IP Address - Enter an IP address using dotted-decimal notation to be compared to a packet's source IP Address as a match criteria for the selected IP ACL rule.

Source IP Mask - Specify the IP Mask in dotted-decimal notation to be used with the Source IP Address value.

Source L4 Port Keyword - Specify a packet's source layer 4 port as a match condition for the selected extended IP ACL rule. This is an optional configuration. The possible values are DOMAIN, ECHO, FTP, FTPDATA, HTTP, SMTP, SNMP, TELNET, TFTP, and WWW. Each of these values translates into its equivalent port number, which is used as both the start and end of the port range.

Source L4 Port Number - Specify a packet's source layer 4 port as a match condition for the selected extended IP ACL rule. This is an optional configuration.

Destination IP Address - Enter an IP address using dotted-decimal notation to be compared to a packet's destination IP Address as a match criteria for the selected extended IP ACL rule.

Destination IP Mask - Specify the IP Mask in dotted-decimal notation to be used with the Destination IP Address value.

Destination L4 Port Keyword - Specify the destination layer 4 port match conditions for the selected extended IP ACL rule. The possible values are DOMAIN, ECHO, FTP, FTPDATA, HTTP, SMTP, SNMP, TELNET, TFTP, and WWW. Each of these values translates into its equivalent port number, which is used as both the start and end of the port range. This is an optional configuration.

Destination L4 Port Number - Specify a packet's destination layer 4 port number match condition for the selected extended IP ACL rule. This is an optional configuration.

Service Type - Select a Service Type match condition for the extended IP ACL rule from the pull down menu. The possible values are IP DSCP, IP precedence, and IP TOS, which are alternative ways of specifying a match criterion for the same Service Type field in the IP header, however each uses a different user notation. After a selection is made the appropriate value can be specified.

- **IP DSCP Configuration**
  Specify the IP DiffServ Code Point (DSCP) field. The DSCP is defined as the high-order six bits of the Service Type octet in the IP header. This is an optional configuration. Enter an integer from 0 to 63. The IP DSCP is selected by possibly selection one of the DSCP keyword from a dropdown box. If a value is to be selected by specifying its numeric value, then select the 'Other' option in the dropdown box and a text box will appear where the numeric value of the DSCP can be entered.

- **IP Precedence Configuration**
  The IP Precedence field in a packet is defined as the high-order three bits of the Service Type octet in the IP header. This is an optional configuration. Enter an integer from 0 to 7.
- **IP TOS Configuration**
  The IP TOS field in a packet is defined as all eight bits of the Service Type octet in the IP header. The TOS Bits value is a hexadecimal number from 00 to FF. The TOS Mask value is a hexadecimal number from 00 to FF. The TOS Mask denotes the bit positions in the TOS Bits value that are used for comparison against the IP TOS field in a packet. For example, to check for an IP TOS value having bits 7 and 5 set and bit 1 clear, where bit 7 is most significant, use a TOS Bits value of 0xA0 and a TOS Mask of 0xFF. This is an optional configuration.

Command Buttons

Configure - Configure the corresponding match criteria for the selected rule.

Delete - Remove the currently selected Rule from the selected ACL. These changes will not be retained across a power cycle unless a save configuration is performed.

8.4.7.4 MAC Config

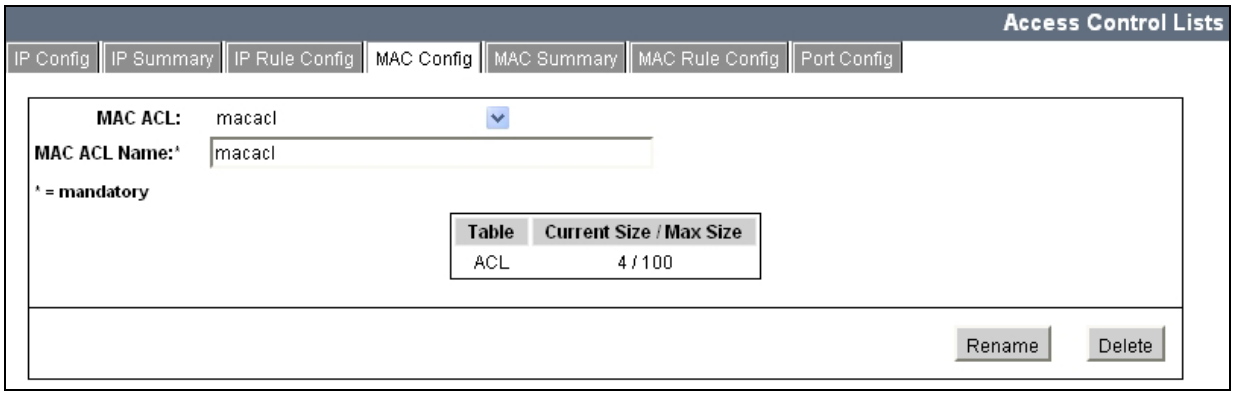

Figure : Access Control Lists MAC Config

A MAC ACL consists of a set of rules which are matched sequentially against a packet. When a packet meets the match criteria of a rule, the specified rule action (Permit/Deny) is taken and the additional rules are not checked for a match. On this menu the interfaces to which an MAC ACL applies must be specified, as well as whether it applies to inbound or outbound traffic. Rules for the MAC ACL are specified/created using the MAC ACL Rule Configuration menu.

Selection Criteria

MAC ACL - A new MAC Access Control List may be created or the configuration of an existing MAC ACL can be updated based on selection.

Configurable Data

MAC ACL Name - Specifies MAC ACL Name string which may include alphabetic, numeric, dash, underscore or space characters only. The name must start with an alphabetic character. This field displays the name of the currently selected MAC ACL if the ACL has already been created.

Non-Configurable Data

Table - Displays the current and maximum number of MAC ACLs.

Current Size - The current number of MAC ACLs.

Max Size – The maximum number of MAC ACLs.

Command Buttons

Apply - Send the updated configuration to the IBP. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

Rename - Renames the currently selected MAC ACL.

Delete - Removes the currently selected MAC ACL from the IBP configuration.

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8.4.7.5 MAC Summary

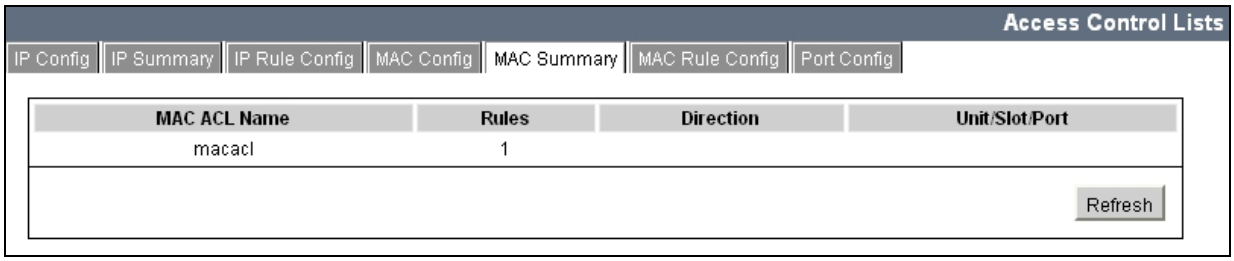

Figure : Access Control Lists MAC Summary

Non-Configurable Data

MAC ACL Name - MAC ACL identifier.

Rules - The number of rules currently configured for the MAC ACL.

Direction - The direction of packet traffic affected by the MAC ACL.
Valid Directions

- Inbound

Slot/Port(s) - The interfaces to which the MAC ACL applies.

Command Buttons

Refresh - Refresh the data on the screen to the latest state.

8.4.7.6 MAC Rule Config

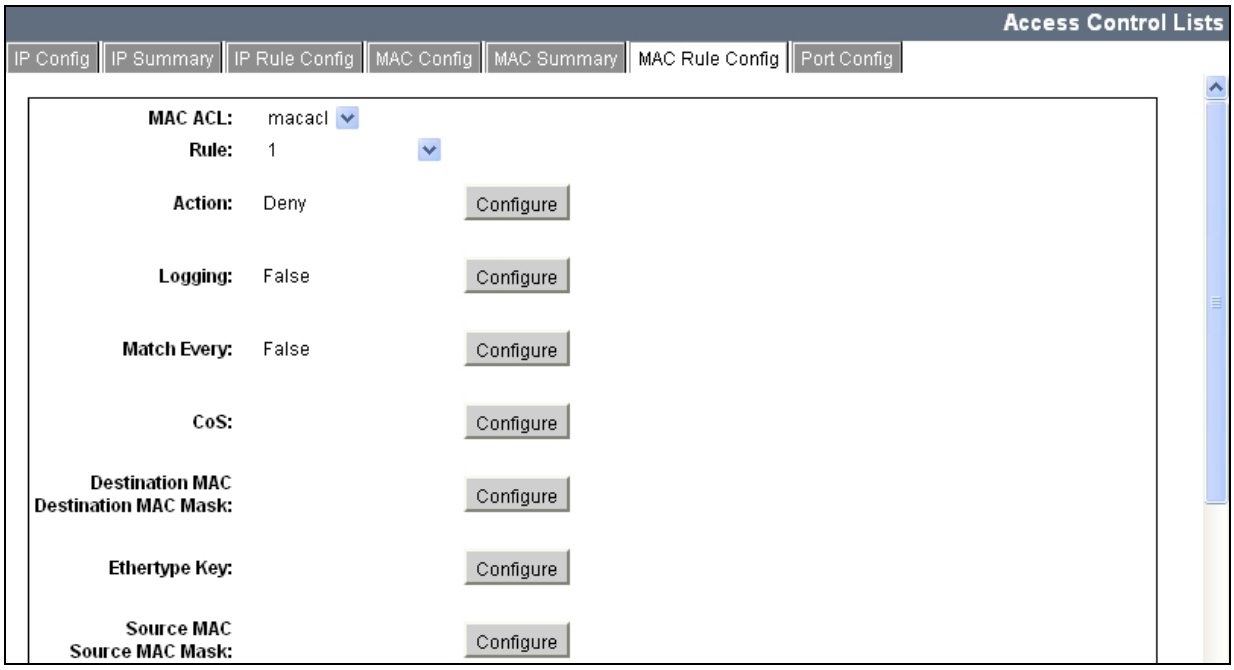

Figure : Access Control Lists MAC Rule Config

Selection Criteria

MAC ACL - Select the MAC ACL for which to create or update a rule.

Rule - Select an existing rule or select 'Create New Rule' to add a new Rule. New rules cannot be created if the maximum number of rules has been reached. For each rule, a packet must match all the specified criteria in order to be true against that rule and for the specified rule action (Permit/Deny) to take place.

Configurable Data

Rule - Enter a whole number in the range of (1 to 10) that will be used to identify the rule.

Action - Specify what action should be taken if a packet matches the rule's criteria. The choices are permit or deny.

Logging - When set to 'True', logging is enabled for this ACL rule (subject to resource availability in the device). If the Access List Trap Flag is also enabled, this will cause periodic traps to be generated indicating the number of times this rule was 'hit' during the current report interval. A fixed 5 minute report interval is used for the entire system. A trap is not issued if the ACL rule hit count is zero for the current interval. This field is visible for a 'Deny' Action.

Assign Queue ID - Specifies the hardware egress queue identifier used to handle all packets matching this ACL rule. Valid range of Queue Ids is (0 to 7). This field is visible for a 'Permit' Action.

Mirror Interface - Specifies the specific egress interface where the matching traffic stream is copied in addition to being forwarded normally by the device. This field cannot be set if a Redirect Interface is already configured for the ACL rule. This field is visible for a 'Permit' Action.

Redirect Interface - Specifies the specific egress interface where the matching traffic stream is forced, bypassing any forwarding decision normally performed by the device. This field cannot be set if a Mirror Interface is already configured for the ACL rule. This field is visible for a 'Permit' Action.

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CoS - Specifies the 802.1p user priority to compare against an Ethernet frame. Valid range of values is (0 to 7).

Secondary CoS - Specifies the Secondary 802.1p user priority to compare against an Ethernet frame. Valid range of values is (0 to 7).

Destination MAC - Specifies the destination MAC address to compare against an Ethernet frame. Valid format is (xx:xx:xx:xx:xx:xx).

The BPDU keyword may be specified using a Destination MAC address of 01:80:C2:xx:xx:xx.

Destination MAC Mask - Specifies the destination MAC address mask specifying which bits in the destination MAC to compare against an Ethernet frame. Valid format is (xx:xx:xx:xx:xx:xx).

The BPDU keyword may be specified using a Destination MAC mask of 00:00:00:ff:ff:ff.

Ethertype Key - Specifies the Ethertype value to compare against an Ethernet frame.
Valid values are

- Appletalk
- ARP
- IBM SNA
- IPv4
- IPv6
- IPX
- MPLS multicast
- MPLS unicast
- NetBIOS
- Novell
- PPPoE
- Reverse ARP
- User Value

Ethertype User Value - Specifies the user defined customized Ethertype value to be used when the user has selected "User Value" as Ethertype Key, to compare against an Ethernet frame. Valid range of values is (0x0600 to 0xFFFF).

Source MAC - Specifies the Source MAC address to compare against an Ethernet frame. Valid format is (xx:xx:xx:xx:xx:xx).

Source MAC Mask - Specifies the Source MAC address mask specifying which bits in the Source MAC to compare against an Ethernet frame. Valid format is (xx:xx:xx:xx:xx:xx).

VLAN - Specifies the VLAN ID to compare against an Ethernet frame. Valid range of values is (0 to 4095). Either VLAN Range or VLAN can be configured.

Secondary VLAN - Specifies the Secondary VLAN ID to compare against an Ethernet frame. Valid range of values is (0 to 4095). Either Secondary VLAN Range or Secondary VLAN can be configured.

Match Every - Specifies an indication to match every Layer 2 MAC packet.
Valid values are

- **True** - Signifies that every packet is considered to match the selected ACL Rule.
- **False** - Signifies that it is not mandatory for every packet to match the selected ACL Rule.

Command Buttons

Apply - Send the updated configuration to the IBP. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

Delete - Remove the currently selected Rule from the selected ACL. These changes will not be retained across a power cycle unless a save configuration is performed.

8.4.7.7 Port Config

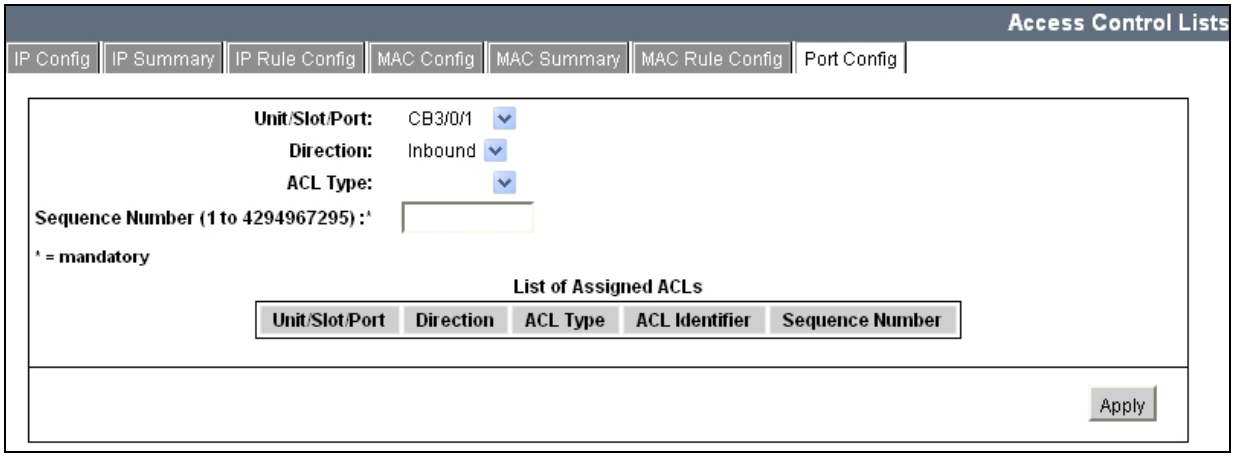

Figure : Access Control Lists Port Config

Selection Criteria

Slot/Port - Specifies list of all available valid interfaces for ACL mapping. All non-routing physical interfaces and interfaces participating in LAGs are listed.

Direction - Specifies the packet filtering direction for ACL.
Valid Directions

- Inbound

ACL Type - Specifies the type of ACL.
Valid ACL Types

- IP ACL
- MAC ACL

IP ACL - Specifies list of all IP ACLs. This field is visible only if the user has selected "IP ACL" as "ACL Type".

MAC ACL - Specifies list of all MAC ACLs. This field is visible only if the user has selected "MAC ACL" as "ACL Type".

Configurable Data

Sequence Number - An optional sequence number may be specified to indicate the order of this access list relative to other access lists already assigned to this interface and direction. A lower number indicates higher precedence order. If a sequence number is already in use for this interface and direction, the specified access list replaces the currently attached access list using that sequence number. If the sequence number is not specified by the user, a sequence number that is one greater than the highest sequence number currently in use for this interface and direction will be used. Valid range is (1 to 4294967295).

Non-Configurable Data

Slot/Port - Displays selected interface.

Direction - Displays selected packet filtering direction for ACL.

ACL Type - Displays the type of ACL assigned to selected interface and direction.

ACL Identifier - Displays the ACL Number(in case of IP ACL) or ACL Name(in case of MAC ACL) identifying the ACL assigned to selected interface and direction.

Sequence Number - Displays the Sequence Number signifying the order of specified ACL relative to other ACLs assigned to selected interface and direction.

Command Buttons

Apply - Send the updated configuration to the IBP. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

Remove - Removes the currently selected ACL Interface Direction Mapping from the IBP configuration.

8.4.8 IP Filter

8.4.8.1 Config

Management IP filter designates stations that are allowed to make configuration changes to the IBP. Select up to five IPv4 and five IPv6 management stations used to manage the IBP. If you choose to define one or more designated management stations, only the chosen stations, as defined by IPv4/IPv6 address, will be allowed management privilege through the web manager, Telnet session, Secure Shell (SSH) or Secure Socket Layer (SSL) for secure HTTP.

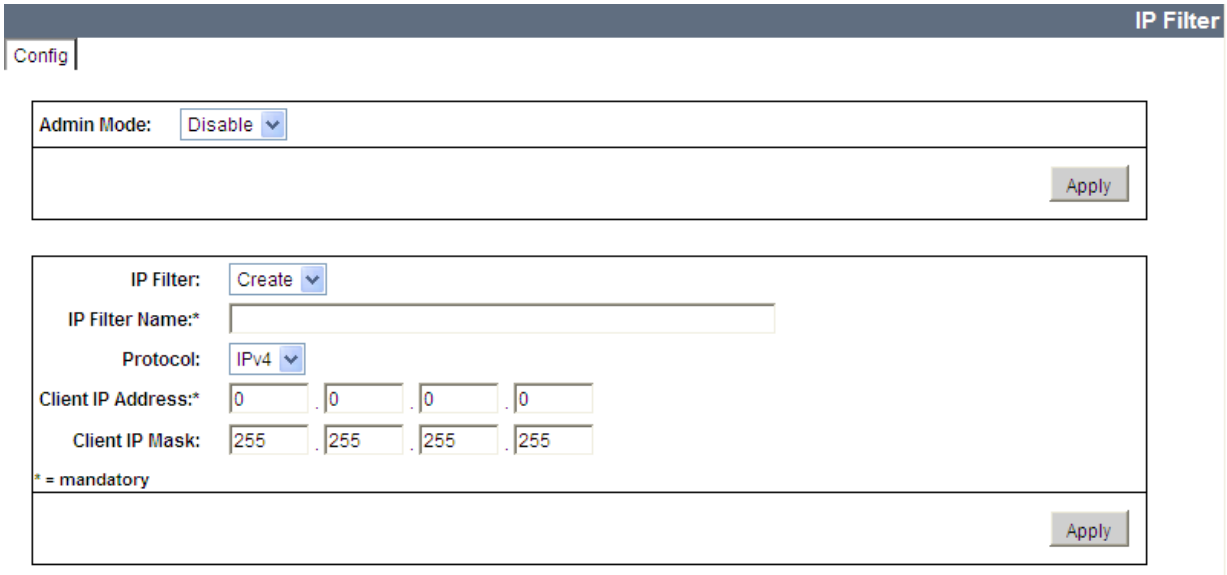

Figure : IP Filter Config

Selection Criteria

Admin Mode - Selects the IP Filter admin mode for enable or disable.

IP Filter - You can use this screen to reconfigure an existing IP Filter, or to create a new one. Use this pulldown menu to select one of the existing IP Filter Names, or select 'Create' to add a new one.

Protocol - Select IPv4 or IPv6 to configure the corresponding attributes.

Configurable Data

IP Filter Name - The IP Filter Name, it identifies each IP Filter. IP Filter name in the IP Filter must be unique. A valid entry is a case-sensitive string of up to 64 characters.

Client IP Address - Taken together, the Client IP Address and Client IP Mask denote a range of IP addresses from which clients may access this device. Every client's IP address is ANDed with the mask, as is the Client IP Address, and, if the values are equal, access is allowed. For example, if the Client IP Address and Client IP Mask parameters are 192.168.1.0/255.255.255.0, then any client whose IP address is 192.168.1.0 through 192.168.1.255 (inclusive) will be allowed access. To allow access from only one station, use a Client IP Mask value of 255.255.255.255, and use that machine's IP address for Client IP Address.

Client IP Mask - Taken together, the Client IP Address and Client IP Mask denote a range of IP addresses from which clients may use access this device. Every client's IP address is ANDed with

the mask, as is the Client IP Address, and, if the values are equal, access is allowed. For example, if the Client IP Address and Client IP Mask parameters are 192.168.1.0/255.255.255.0, then any client whose IP address is 192.168.1.0 through 192.168.1.255 (inclusive) will be allowed access. To allow access from only one station, use a Client IP Mask value of 255.255.255.255, and use that machine's IP address for Client IP Address.

Prefix/Prefix Length - The combination of IPv6 Prefix and IPv6 Prefix length denote a range of IP Addresses from which clients may access this device.

Command Buttons

Apply - Send the updated screen to the IBP. Changes take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

Delete - Delete the currently selected IP Filter Name. If you want the switch to retain the new values across a power cycle, you must perform a save.

8.4.9 Secure HTTP

8.4.9.1 Config

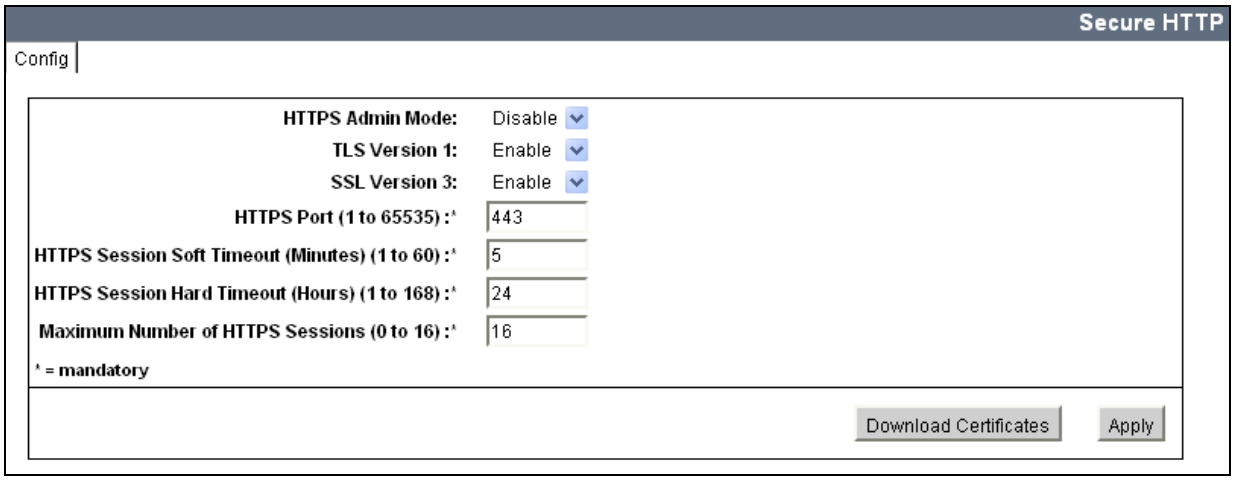

Figure : Secure HTTP Config

Configurable Data

HTTPS Admin Mode - This select field is used to Enable or Disable the Administrative Mode of Secure HTTP. The currently configured value is shown when the web page is displayed. The default value is Disable.

TLS Version 1 - This select field is used to Enable or Disable Transport Layer Security Version 1.0. The currently configured value is shown when the web page is displayed. The default value is Enable.

SSL Version 3 - This select field is used to Enable or Disable Secure Sockets Layer Version 3.0. The currently configured value is shown when the web page is displayed. The default value is Enable.

HTTPS Port Number - This field is used to set the HTTPS Port Number. The value must be in the range of 1 to 65535. Port 443 is the default value. The currently configured value is shown when the web page is displayed.

HTTPS Session Soft Timeout - This field is used to set the inactivity timeout for HTTPS sessions. The value must be in the range of (1 to 60) minutes. The default value is 5 minutes. The currently configured value is shown when the web page is displayed.

HTTPS Session Hard Timeout - This field is used to set the hard timeout for HTTPS sessions. This timeout is unaffected by the activity level of the session. The value must be in the range of (1 to 168) hours. The default value is 24 hours. The currently configured value is shown when the web page is displayed.

Maximum Number of HTTPS Sessions - This field is used to set the maximum allowable number of HTTPS sessions. The value must be in the range of (0 to 16). The default value is 16. The currently configured value is shown when the web page is displayed.

Command Buttons

Apply - Send the updated screen to the IBP. Changes take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

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Download Certificates - Link to the File Transfer page for the SSL Certificate download. Note that to download SSL Certificate files SSL must be administratively disabled.

8.4.10 Secure Shell

8.4.10.1 Config

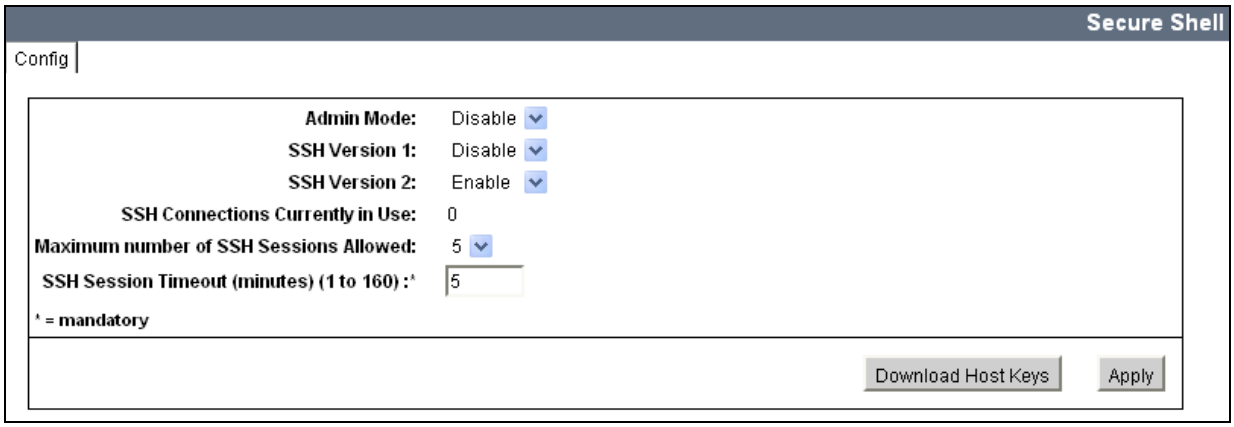

Figure : Secure Shell Config

Configurable Data

Admin Mode - This select field is used to Enable or Disable the administrative mode of SSH. The currently configured value is shown when the web page is displayed. The default value is Disable.

SSH Version 1 - This select field is used to Enable or Disable Protocol Level 1 for SSH. The currently configured value is shown when the web page is displayed. The default value is Enable.

SSH Version 2 - This select field is used to Enable or Disable Protocol Level 2 for SSH. The currently configured value is shown when the web page is displayed. The default value is Enable.

Maximum Number of SSH Sessions Allowed - This select field is used to configure the maximum number of inbound SSH sessions allowed on the IBP. The currently configured value is shown when the web page is displayed. The range of acceptable values for this field is (0-5).

SSH Session Timeout (Minutes) - This text field is used to configure the inactivity timeout value for incoming SSH sessions to the IBP. The acceptable range for this value is (1-160) minutes.

Non-Configurable Data

SSH Connections in Use - Displays the number of SSH connections currently in use in the system.

Command Buttons

Apply - Send the updated screen to the IBP. Changes take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

Download Host Keys - Link to the File Transfer page for the Host Key download. Note that to download SSH key files SSH must be administratively disabled and there can be no active SSH sessions.

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8.4.11 Denial-of-Service

8.4.11.1 Config

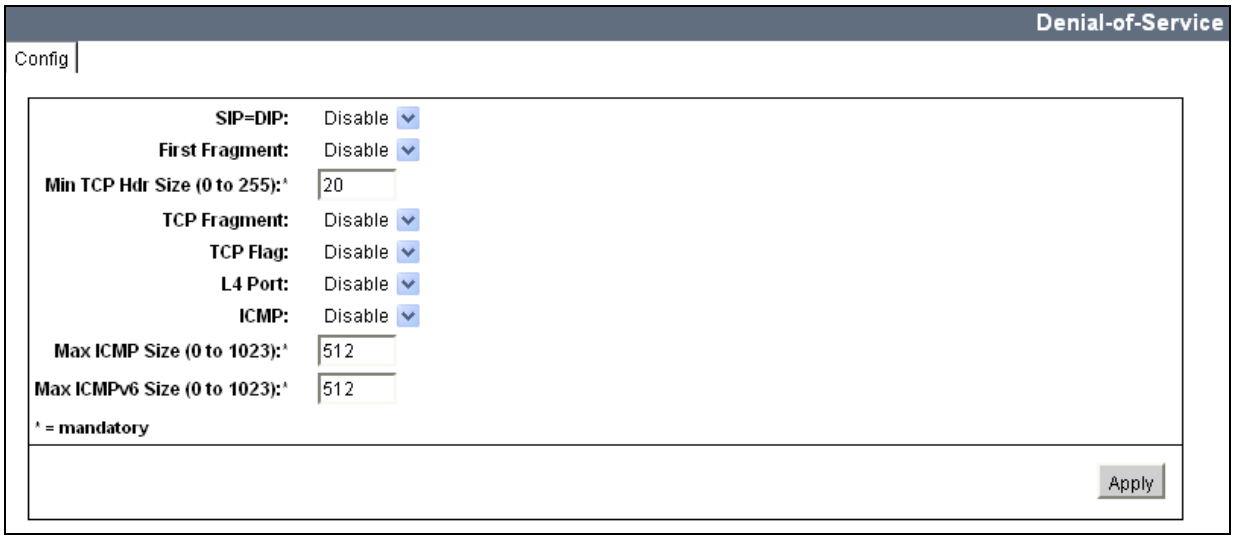

Figure : Denial-of-Service Config

Configurable Data

SIP=DIP - Enable or disable this option by selecting the corresponding line on the pull down entry field. Enabling SIP=DIP DoS prevention causes the IBP to drop packets that have a source IP address equal to the destination IP address. The factory default is disabled.

First Fragment - Enable or disable this option by selecting the corresponding line on the pull down entry field. Enabling First Fragment DoS prevention causes the IBP to drop packets that have a TCP header smaller then the configured Min TCP Hdr Size. The factory default is disabled.

Min TCP Hdr Size - Specify the Min TCP Hdr Size allowed. If First Fragment DoS prevention is enabled, the IBP will drop packets that have a TCP header smaller then this configured Min TCP Hdr Size. The factory default is disabled. *(Note: This attribute is provided in stackable Ethernet Connection Blade)*

TCP Fragment - Enable or disable this option by selecting the corresponding line on the pull down entry field. Enabling TCP Fragment DoS prevention causes the IBP to drop packets that have an IP fragment offset equal to 1. The factory default is disabled.

TCP Flag - Enable or disable this option by selecting the corresponding line on the pull down entry field. Enabling TCP Flag DoS prevention causes the IBP to drop packets that have TCP flag SYN set and TCP source port less than 1024 or TCP control flags set to 0 and TCP sequence number set to 0 or TCP flags FIN, URG, and PSH set and TCP sequence number set to 0 or both TCP flags SYN and FIN set. The factory default is disabled.

L4 Port - Enable or disable this option by selecting the corresponding line on the pull down entry field. Enabling L4 Port DoS prevention causes the IBP to drop packets that have TCP/UDP source port equal to TCP/UDP destination port. The factory default is disabled.

ICMP - Enable or disable this option by selecting the corresponding line on the pull down entry field. Enabling ICMP DoS prevention causes the IBP to drop ICMP packets that have a type set to ECHO_REQ (ping) and a size greater than the configured ICMP Pkt Size. The factory default is disabled.

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Max ICMP Pkt Size - Specify the Max ICMP Pkt Size allowed. If ICMP DoS prevention is enabled, the IBP will drop ICMP ping packets that have a size greater then this configured Max ICMP Pkt Size. The factory default is disabled.

Max ICMPv6 Pkt Size - Specify the Max ICMPv6 Pkt Size allowed. If ICMP DoS prevention is enabled, the IBP will drop ICMPv6 ping packets that have a size greater then this configured Max ICMPv6 Pkt Size. The factory default is disabled.

Command Buttons

Apply - Update the IBP with the values on the screen. If you want the IBP to retain the new values across a power cycle you must perform a save.

8.5 QoS Menu

This section provides users to configure Differentiated Services, and Class of Service.

8.5.1 Differentiated Services

8.5.1.1 Global Config

Packets are filtered and processed based on defined criteria. The filtering criteria is defined by a class. The processing is defined by a policy's attributes. Policy attributes may be defined on a per-class instance basis, and it is these attributes that are applied when a match occurs.

The configuration process begins with defining one or more match criteria for a class. Then one or more classes are added to a policy. Policies are then added to interfaces.

Packet processing begins by testing the match criteria for a packet. The 'all' class type option defines that each match criteria within a class must evaluate to true for a packet to match that class. The 'any' class type option defines that at least one match criteria must evaluate to true for a packet to match that class. Classes are tested in the order in which they were added to the policy. A policy is applied to a packet when a class match within that policy is found.

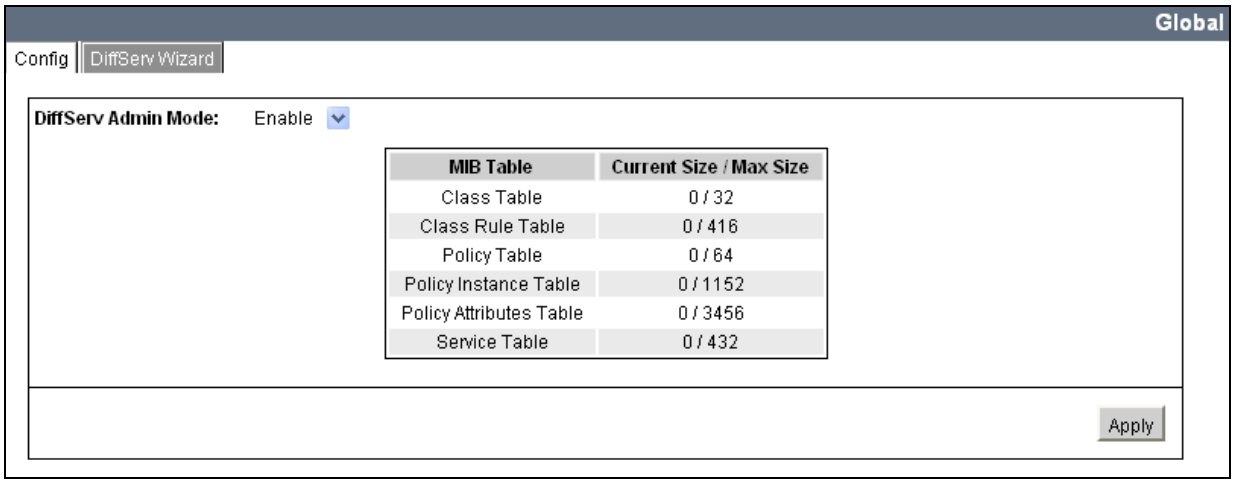

Figure : Differentiated Services Global Config

Selection Criteria

DiffServ Admin Mode - This lists the options for the mode, from which one can be selected. The default value is 'enable'. While disabled, the DiffServ configuration is retained when saved and can be changed, but it is not activated. When enabled, Diffserv services are activated.

Non-Configurable Data

Class table - Displays the number of configured DiffServ classes out of the total allowed on the IBP.

Class Rule table - Displays the number of configured class rules out of the total allowed on the IBP.

Policy table - Displays the number of configured policies out of the total allowed on the IBP.

Policy Instance table - Displays the number of configured policy class instances out of the total allowed on the IBP.

Policy Attributes table - Displays the number of configured policy attributes (attached to the policy class instances) out of the total allowed on the IBP.

Service table - Displays the number of configured services (attached to the policies on specified interfaces) out of the total allowed on the IBP.

Command Buttons

Apply - Send the updated screen to the IBP and cause the changes to take effect on the IBP, but these changes will not be retained across a power cycle unless a save operation is performed.

8.5.1.2 DiffServ Wizard

The DiffServ Wizard enables DiffServ on the IBP by creating a traffic class, adding the traffic class to a policy, and then adding the policy to the ports selected on DiffServ Wizard page. The DiffServ Wizard will:

- Create a DiffServ Class and define match criteria used as a filter to determine if incoming traffic meets the requirements to be a member of the class.
- Set the DiffServ Class match criteria based on Traffic Type selection as below:
  - VOIP - sets match criteria to UDP protocol.
  - HTTP - sets match criteria to HTTP destination port.
  - FTP - sets match criteria to FTP destination port.
  - Telnet - sets match criteria to Telnet destination port.
  - Every - sets match criteria all traffic.
- Create a DiffServ Policy and adds the DiffServ Policy to the DiffServ Class created.
- If Policing is set to YES, then DiffServ Policy style is set to Simple. Traffic which conforms to the Class Match criteria will be processed according to the Outbound Priority selection. Outbound Priority configures the handling of conforming traffic as below:
  - High - sets policing action to markdscp ef.
  - Med - sets policing action to markdscp af31.
  - Low - sets policing action to send.
- If Policing is set to NO, then all traffic will be marked as specified below:
  - High - sets policy mark ipdscp ef.
  - Med - sets policy mark ipdscp af31.
  - Low - sets policy mark ipdscp be.
- Each port selected will be added to the policy created.

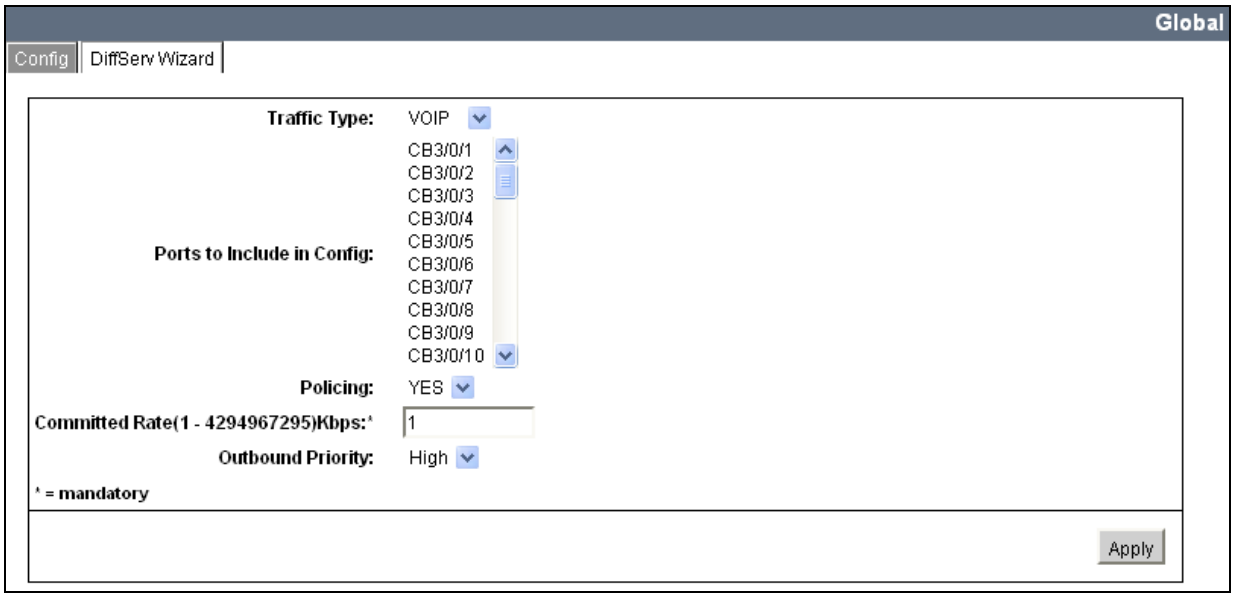

Figure : Differentiated Services Wizard

Selection Criteria

Traffic Type - Traffic type is used to define the DiffServ Class. Traffic type options: VOIP, HTTP, FTP, Telnet, and Every.

Policing - Enabling policing will add policing to the DiffServ Policy and the policing rate will be applied.

Outbound Priority - When Policing is enabled, Outbound Priority defines the type of policing conform action where: High sets action to markdscp ef, Med sets action to markdscp af31, and Low sets action to send. When Policing is disabled, Outbound Priority defines the policy where: High sets policy to mark ipdscp ef, Med sets policy to mark ipdscp af31, Low set policy to mark ipdscp be.

Configurable Data

Ports to Include in Config - List the ports which can be configured to support a DiffServ policy. The DiffServ policy will be added to selected ports.

Committed Rate - When Policing is enabled, the committed rate will be applied to the policy and the policing action is set to conform. When Policing is disabled, the committed rate is not applied and the policy is set to markdscp.

Command Buttons

Apply - Send the updated screen to the IBP and cause the changes to take effect on the IBP, but these changes will not be retained across a power cycle unless a save operation is performed.

8.5.1.3 Class Config

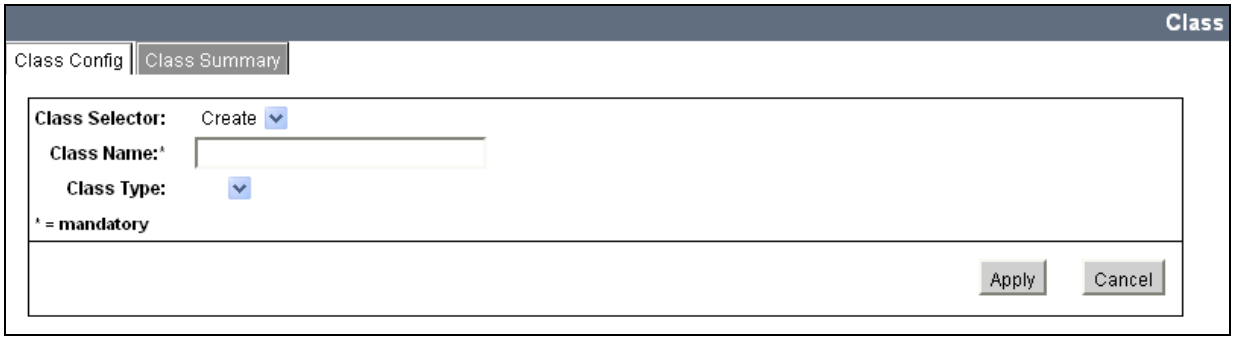

Figure : Differentiated Services Class Config

Selection Criteria

Class Selector - Along with an option to create a new class, this lists all the existing DiffServ class names, from which one can be selected. The content of this screen varies based on the selection of this field. If an existing class is selected then the screen will display the configured class. If '--create--' is selected, another screen appears to facilitate creation of a new class. The default is the first class created. If no classes exist, the default is '--create--'.

Class Type - This lists all the platform supported DiffServ class types from which one can be selected. Options:

- All

Only when a new class is created, this field is a selector field. After class creation this becomes a non-configurable field displaying the configured class type.

Class Match Selector - This lists all match criteria from which one can be selected to be added to a specified class. The match criterion 'Any' denotes that all packets are considered to match the specified class and no additional input information is needed. The content of this drop down list varies for a specified class based on the selection of the match criterion 'Reference Class':

- If the specified class does not reference any other class, the 'Reference Class' match criterion is included in the drop down match criteria list. A class reference can be established by selecting 'Reference Class' and invoking the 'Add Match Criteria' button.
- If the specified class references another class, the 'Reference Class' match criterion is not included in the drop down match criteria list. This prevents the user from trying to add yet another class reference, since a specified class can reference at most one other class of the same type. Moreover, a 'Remove Class Reference' button appears on the screen that can be invoked to remove the current class reference.

Configurable Data

Class Name - This is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying a class. Class name 'default' is reserved and must not be used.

Non-Configurable Data

Class Type - Displays type of the configured class Only when a new class is created, this field is a selector field. After class creation this becomes a non-configurable field.

Match Criteria - Displays the configured match criteria for the specified class.

Values - Displays the values of the configured match criteria.

Command Buttons

Apply - Send the updated screen to the IBP and cause the changes to take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

Cancel - Cancel the currently selected filter.

Delete - Delete the currently selected filter.

Rename - Allows to rename a specified class.

Add Match Criteria - Only one match criterion can be specified each time this button is invoked. Based on the selected match criterion, an individual match criterion screen is provided to configure its value.

Match criteria cannot be deleted from a class. The class must be deleted in order to remove the match criteria.

Remove Class Reference - This button appears on the screen only if a specified class references another class. The current class reference, of the specified class, is removed by invoking this button.

8.5.1.4 Class Summary

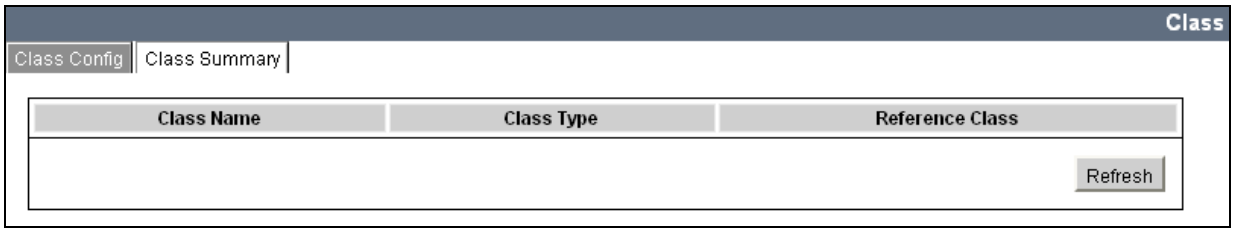

Figure : Differentiated Services Class Summary

Non-Configurable Data

Class Name - Displays names of the configured DiffServ classes.

Class Type - Displays types of the configured classes.Class types are platform dependent.

Reference Class - Displays name of the configured class of type

- All

referenced by the specified class of the same type.

Command Buttons

Refresh - Refresh the currently selected filter.

8.5.1.5 Policy Config

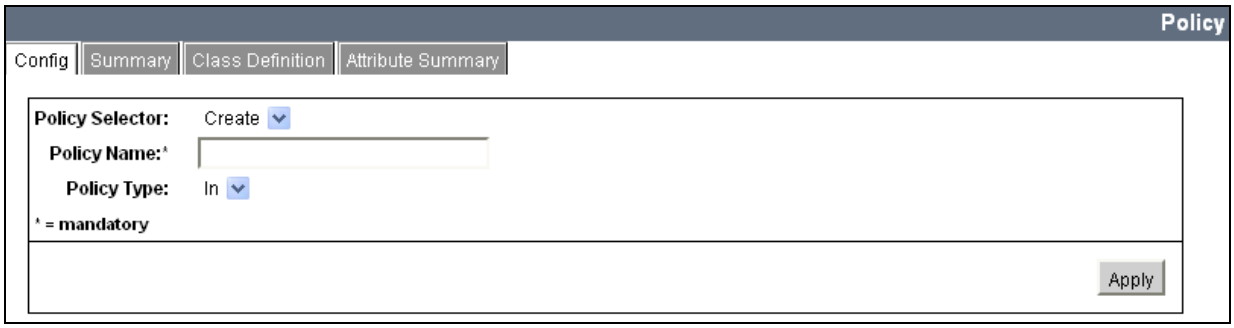

Figure : Differentiated Services Policy Config

Selection Criteria

Policy Selector - Along with an option to create a new policy, this lists all the existing DiffServ policy names, from which one can be selected. The content of this screen varies based on the selection of this field. If an existing policy is selected then the screen will display Member Classes for that DiffServ policy. If 'create' is selected, another screen appears to facilitate creation of a new policy. The default is 'create'.

Policy Type - *In* indicates the type is specific to inbound traffic direction.. Only when a new policy is created, this field is a selector field. After policy creation this becomes a non-configurable field displaying the configured policy type.

Available Class List - This lists all existing DiffServ class names, from which one can be selected. This field is a selector field only when a new policy class instance is to be created. After creation of the policy class instance this becomes a non-configurable field.

Member Class List - This lists all existing DiffServ classes currently defined as members of the specified Policy, from which one can be selected. This list is automatically updated as a new class is added to or removed from the policy. This field is a selector field only when an existing policy class instance is to be removed. After removal of the policy class instance this becomes a non-configurable field.

Configurable Data

Policy Name - This is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying a policy.

Non-Configurable Data

Policy Type - *In* indicates the type is specific to inbound traffic direction.. Only when a new policy is created, this field is a selector field. After policy creation this becomes a non-configurable field displaying the configured policy type.

Member Class List - Displays all the member classes for the selected DiffServ policy. It is automatically updated as a new class is added to or removed from the policy. Only when an existing policy class instance is to be removed, this field is a selector field. After removal of the policy class instance this becomes a non-configurable field.

Available Class List - Displays all the member classes for the specified policy. It is automatically updated as a new class is added to or removed from the policy. Only when a new policy class instance is to be created this field is a selector field. After creation of the policy class instance this becomes a non-configurable field.

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Command Buttons

Apply - Send the updated screen to the IBP and cause the changes to take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

Delete - Delete the currently selected filter.

Rename - Allows to rename a specified policy.

Add Selected Class - Creates a policy class instance by attaching the policy to the specified class.

Remove Selected Class - Removes a policy class instance by detaching the policy from the specified class.

8.5.1.6 Policy Summary

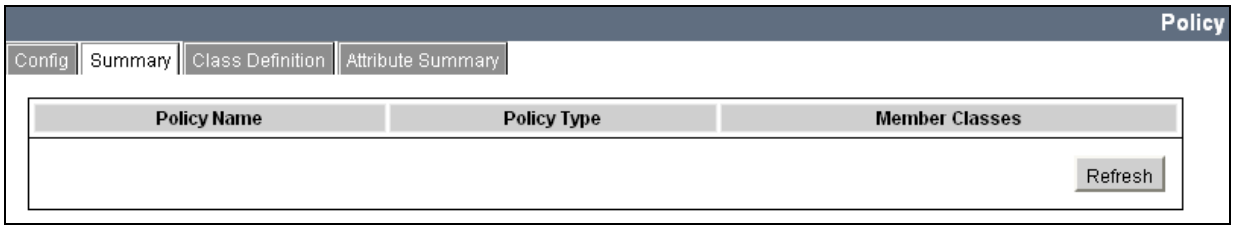

Figure : Differentiated Services Policy Summary

Non-Configurable Data

Policy Name - Displays name of the DiffServ policy.

Policy Type - Displays type of the policy as In

Member Classes - Displays name of each class instance within the policy.

Command Buttons

Refresh - Refresh the currently selected filter.

8.5.1.7 Policy Class Definition

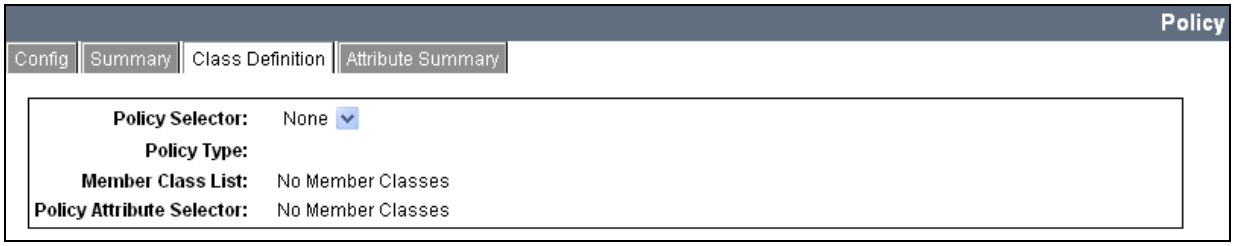

Figure : Differentiated Services Policy Class Definition

Selection Criteria

Policy Selector - This lists all the existing DiffServ policy names, from which one can be selected.

Member Class List - This lists all existing DiffServ classes currently defined as members of the specified Policy, from which one can be selected. This list is automatically updated as a new class is added to or removed from the policy.

Policy Attribute Selector - This lists all attributes supported for this type of policy, from which one can be selected.

Non-Configurable Data

Policy Type - Displays type of the configured policy.

Command Buttons

Configure Selected Attribute - Only one configuration criterion can be specified per invocation of this button. Based on the selected configuration criterion, an individual configuration screen is provided.

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8.5.1.8 Policy Attribute Summary

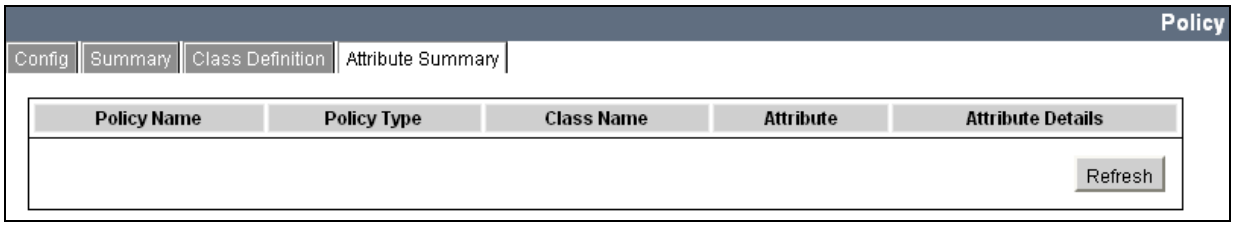

Figure : Differentiated Services Policy Attribute Summary

Non-Configurable Data

Policy Name - Displays name of the specified DiffServ policy.

Policy Type - Displays type of the specified policy as In.

Class Name - Displays name of the DiffServ class to which this policy is attached.

Attribute - Displays the attributes attached to the policy class instances.

Attribute Details - Displays the configured values of the attached attributes.

Command Buttons

Refresh - Refresh the displayed data.

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8.5.1.9 Service Config

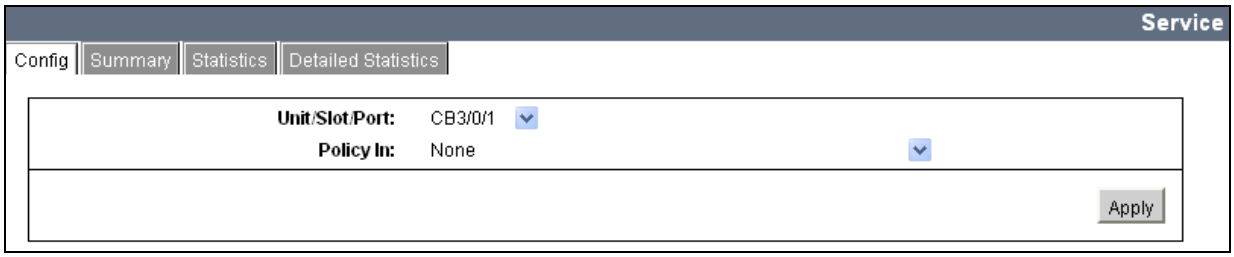

Figure : Differentiated Services Service Config

Selection Criteria

Slot/Port - Select the Slot/Port that uniquely specifies an interface. This is a list of all valid slot number and port number combinations in the system. For Read/Write users where 'All' appears in the list, select it to specify all interfaces.

Direction - Select the traffic direction of this service interface. This selection is only available to Read/Write users when Slot/Port is specified as 'All'.

Configurable Data

Policy In - This lists all the policy names of type 'In' from which one can be selected. If 'none' is selected, this will detach the policy from the interface in this direction. This field is not shown for Read/Write users where inbound service policy attachment is not supported by the platform.

Non-Configurable Data

This information is only displayed when Slot/Port is specified as 'All'.

Slot/Port - Shows the Slot/Port that uniquely specifies an interface.

Direction - Shows that the traffic direction of this service interface is In.

Oper. Status - Shows the operational status of this service interface, either Up or Down.

Policy Name - Shows the name of the attached policy.

Command Buttons

Apply - Send the updated screen to the IBP and cause the changes to take effect on the IBP but these changes will not be retained across a power cycle unless a save is performed.

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8.5.1.10 Service Summary

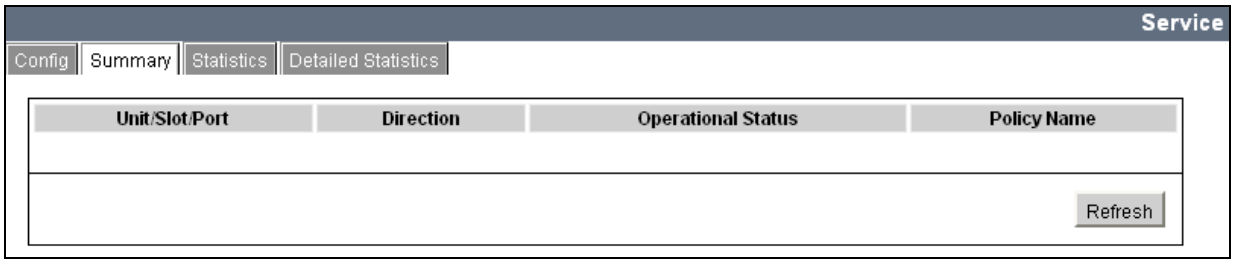

Figure : Differentiated Services Service Summary

Non-Configurable Data

Slot/Port - Shows the Slot/Port that uniquely specifies an interface.

Direction - Shows that the traffic direction of this service interface In.

Oper. Status - Shows the operational status of this service interface, either Up or Down.

Policy Name - Shows the name of the attached policy.

Command Buttons

Refresh - Refresh the displayed data.

8.5.1.11 Service Statistics

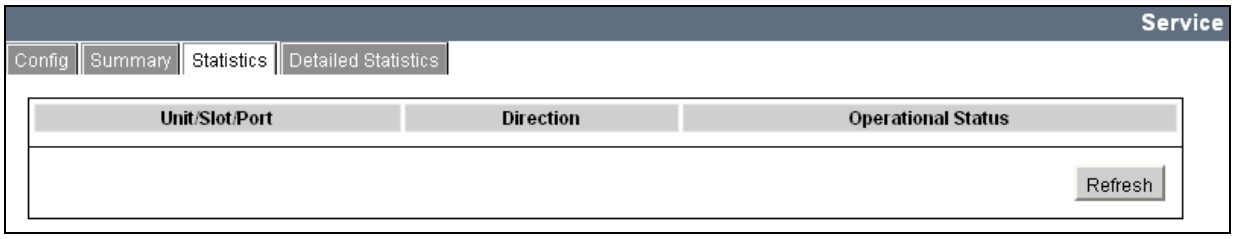

Figure : Differentiated Services Service Statistics

This screen displays service-level statistical information in tabular form for all interfaces in the system to which a DiffServ policy has been attached in the inbound traffic directions. Use the 'Counter Mode Selector' to specify the counter display mode as either octets or packets.

Non-Configurable Data

Slot/Port - Shows the Slot/Port that uniquely specifies an interface.

Direction - Shows that the traffic direction of this service interface is In.

Operational Status - Shows the operational status of this service interface, either Up or Down.

Command Buttons

Refresh - Refresh the displayed data.

8.5.1.12 Service Detailed Statistics

This screen displays class-oriented statistical information for the policy, which is specified by the interface and direction. The 'Member Classes' drop down list is populated on the basis of the specified interface and direction and hence the attached policy (if any). Highlighting a member class name displays the statistical information for the policy-class instance for the specified interface and direction.

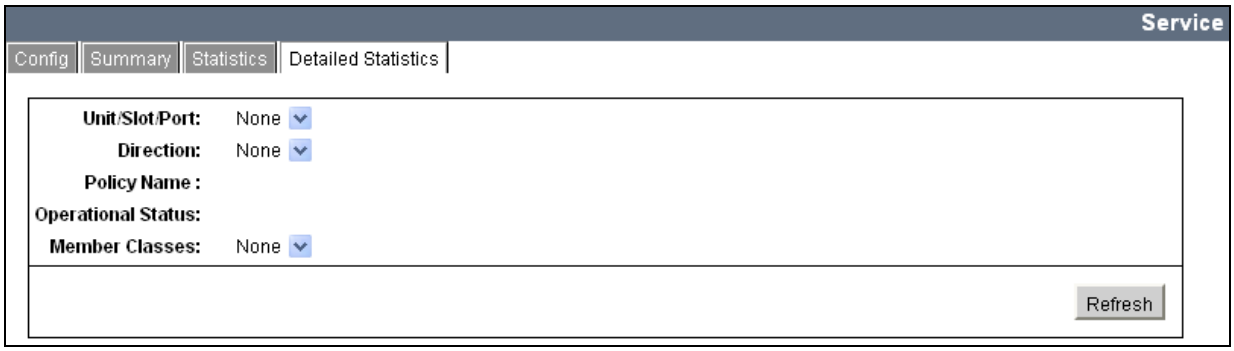

Figure : Differentiated Services Service Detailed Statistics

Selection Criteria

Slot/Port - List of all valid slot number and port number combinations in the system that have a DiffServ policy currently attached in In direction.

Direction - List of the traffic direction of interface as In. Only shows the direction(s) for which a DiffServ policy is currently attached.

Member Classes - List of all DiffServ classes currently defined as members of the selected Policy Name. Choose one member class name at a time to display its statistics. If no class is associated with the chosen policy then nothing will be populated in the list.

Non-Configurable Data

Policy Name - Name of the policy currently attached to the specified interface and direction.

Operational Status - Operational status of the policy currently attached to the specified interface and direction. The value is either Up or Down.

Command Buttons

Refresh - Refresh the displayed data.

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8.5.2 Class of Service

8.5.2.1 Trust Mode

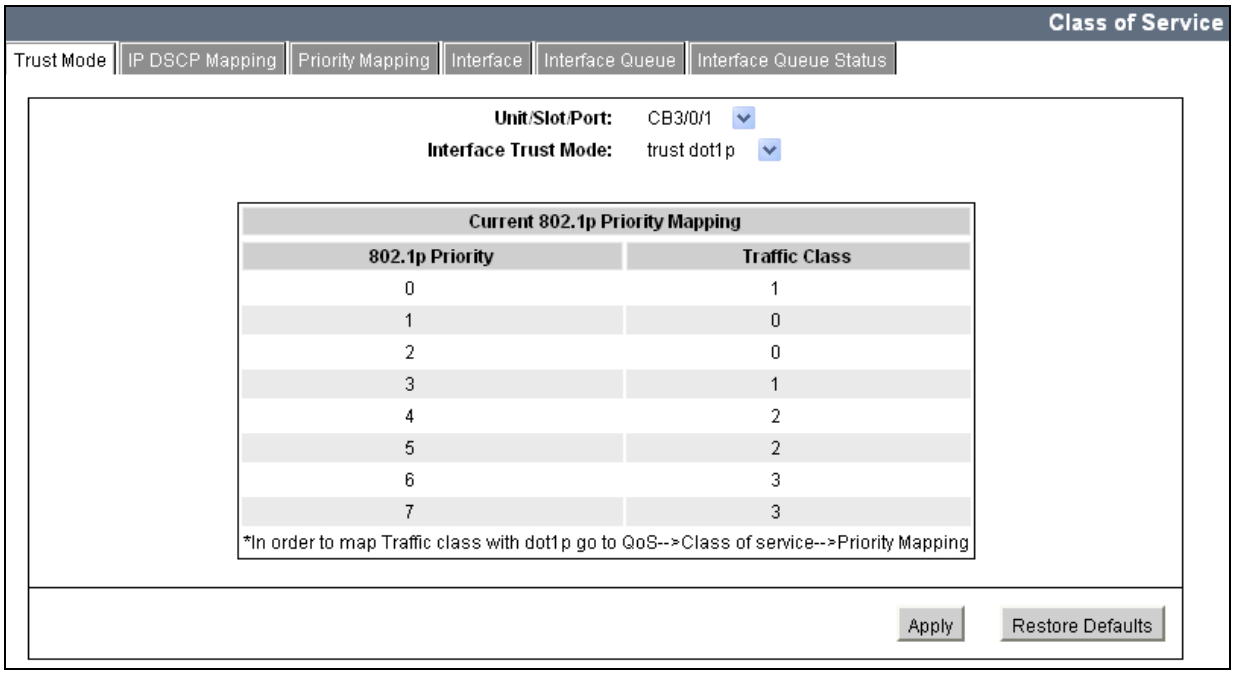

Figure : Class of Service Trust Mode

Selection Criteria

Slot/Port - Specifies all CoS configurable interfaces. The option "Global" represents the most recent global configuration settings. These may be overridden on a per-interface basis.

Interface Trust Mode - Specifies whether or not to trust a particular packet marking at ingress. Interface Trust Mode can only be one of the following:

- untrusted
- trust dot1p
- trust ip-dscp

Default value is trust dot1p.

Non-Configurable Data

Untrusted Traffic Class - Displays traffic class (i.e. queue) to which all traffic is directed when in 'untrusted' mode. Valid Range is (0 to 7).

Non-IP Traffic Class - Displays traffic class (i.e. queue) to which all non-IP traffic is directed when in 'trust ip-precedence' or 'trust ip-dscp' mode. Valid Range is (0 to 7).

Current 802.1p Priority Mapping - Displays the current 802.1p priority mapping configuration.

Command Buttons

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Apply - Send the updated configuration to the IBP. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

Restore Defaults - Restores default settings.

8.5.2.2 IP DSCP Mapping

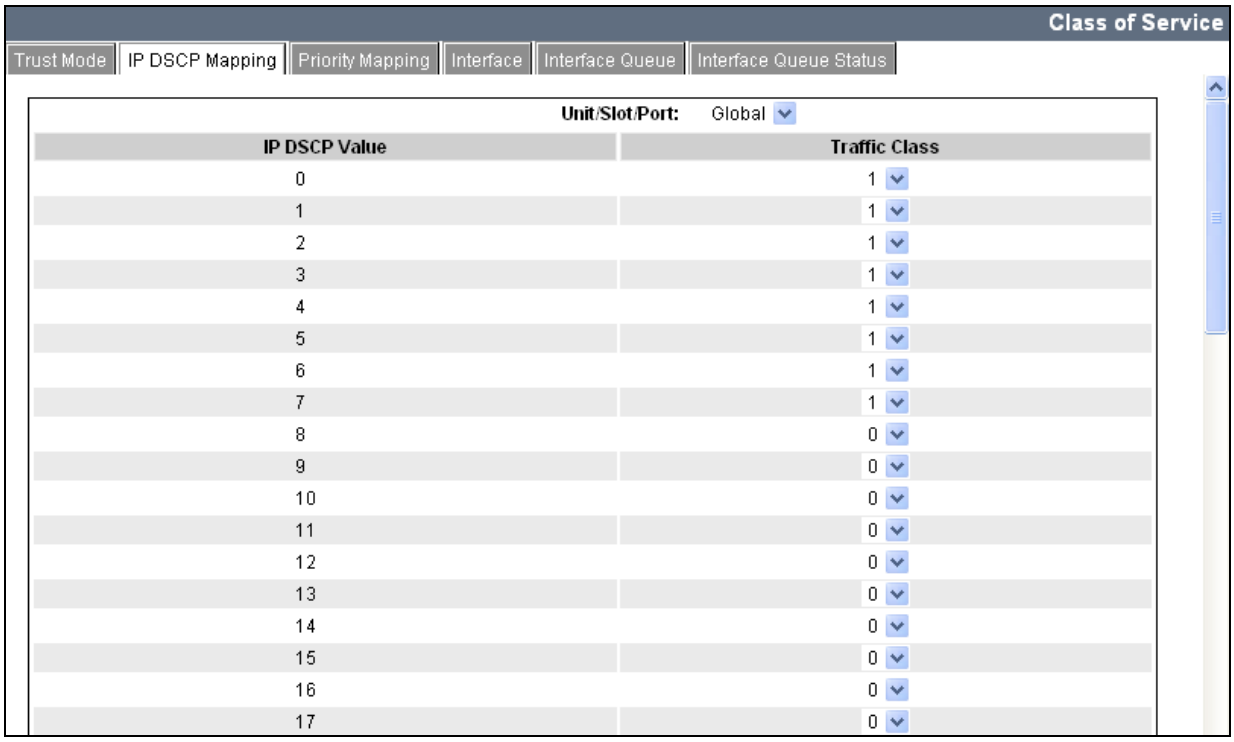

Figure : Class of Service IP DSCP Mapping

Selection Criteria

Slot/Port - Specifies all CoS configurable interfaces. The option "Global" represents the most recent global configuration settings.

Configurable Data

IP DSCP Traffic Class - Specify which internal traffic class to map the corresponding IP DSCP value. Valid Range is (0 to 7) .

Non-Configurable Data

IP DSCP Value - Specify the IP DiffServ Code Point (DSCP) Value.

Command Buttons

Apply - Send the updated configuration to the IBP. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

Restore Defaults - Restores default settings.

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8.5.2.3 Priority Mapping

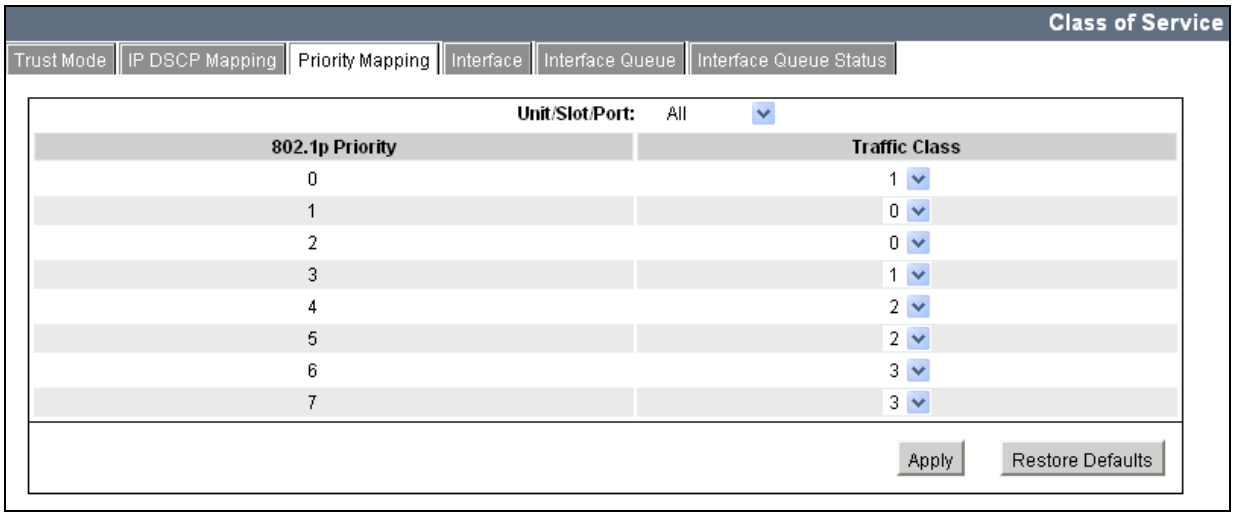

Figure : Class of Service Priority Mapping

Selection Criteria

Slot/Port - Select the physical interface for which you want to display or configure data. Select 'All' to set the parameters for all ports to the same values.

Configurable Data

Traffic Class - Specify which internal traffic class to map the corresponding 802.1p priority.

Non-Configurable Data

802.1p Priority - Displays the 802.1p priority to be mapped.

Command Buttons

Apply - Update the IBP with the values on this screen. If you want the IBP to retain the new values across a power cycle, you must perform a save.

Restore Defaults - Restores default settings.

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8.5.2.4 Interface

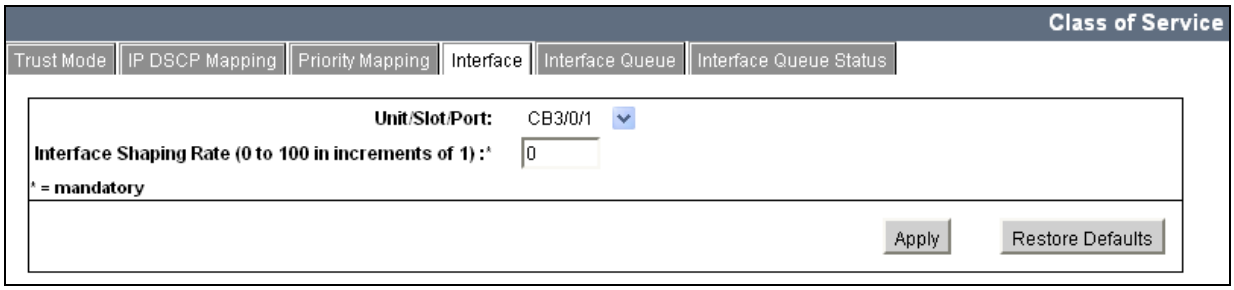

Figure : Class of Service Interface Config

Selection Criteria

Slot/Port - Specifies all CoS configurable interfaces. The option "Global" represents the most recent global configuration settings. These may be overridden on a per-interface basis.

Configurable Data

Interface Shaping Rate - Specifies the maximum bandwidth allowed, typically used to shape the outbound transmission rate. This value is controlled independently of any per-queue maximum bandwidth configuration. It is effectively a second-level shaping mechanism. Default value is 0. Valid Range is (0 to 100) in increments of 5 . The value 0 means maximum is unlimited.

Command Buttons

Restore Defaults - Restores default settings.

Apply - Send the updated configuration to the IBP. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

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8.5.2.5 Interface Queue

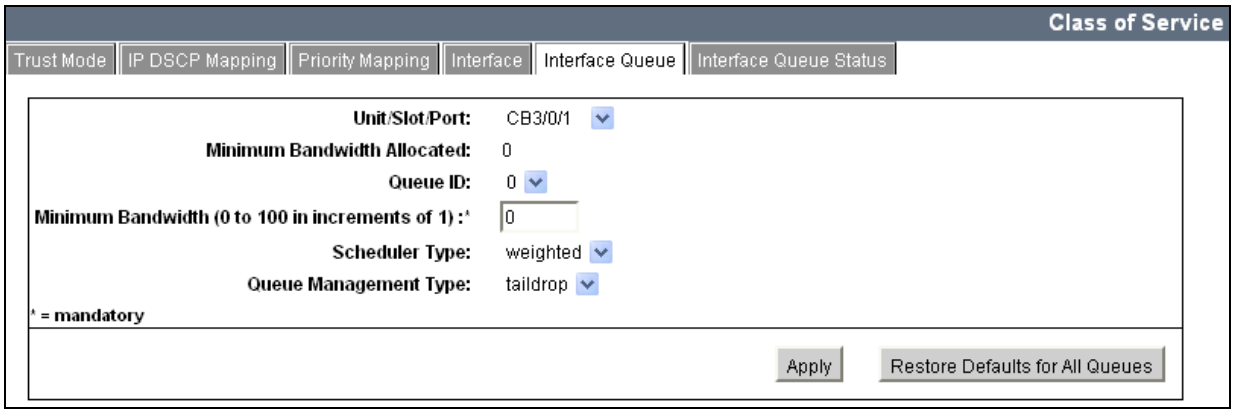

Figure : Class of Service Interface Queue Config

Selection Criteria

Slot/Port - Specifies all CoS configurable interfaces. The option "Global" represents the most recent global configuration settings. These may be overridden on a per-interface basis.

Queue ID - Specifies all the available queues per interface(platform based).

Scheduler Type - Specifies the type of scheduling used for this queue.
Scheduler Type can only be one of the following:

- strict
- weighted

Default value is weighted.

Queue Management Type - Queue depth management technique used for queues on this interface. This is only used if device supports independent settings per-queue.
Queue Management Type can only be one of the following:

- taildrop

Default value is taildrop.

Configurable Data

Minimum Bandwidth Allocated - Specifies the sum of individual Minimum Bandwidth values for all queues in the interface. The sum cannot exceed the defined maximum (100). This value is considered while configuring the Minimum Bandwidth for a queue in the selected interface.

Minimum Bandwidth - Specifies the minimum guaranteed bandwidth allotted to this queue. Setting this value higher than its corresponding Maximum Bandwidth automatically increases the maximum to the same value. Default value is 0. Valid Range is (0 to 100) in increments of 5 . The value 0 means no guaranteed minimum. Sum of individual Minimum Bandwidth values for all queues in the selected interface cannot exceed defined maximum (100).

Command Buttons

Restore Defaults for All Queues - Restores default settings for all queues on the selected interface.

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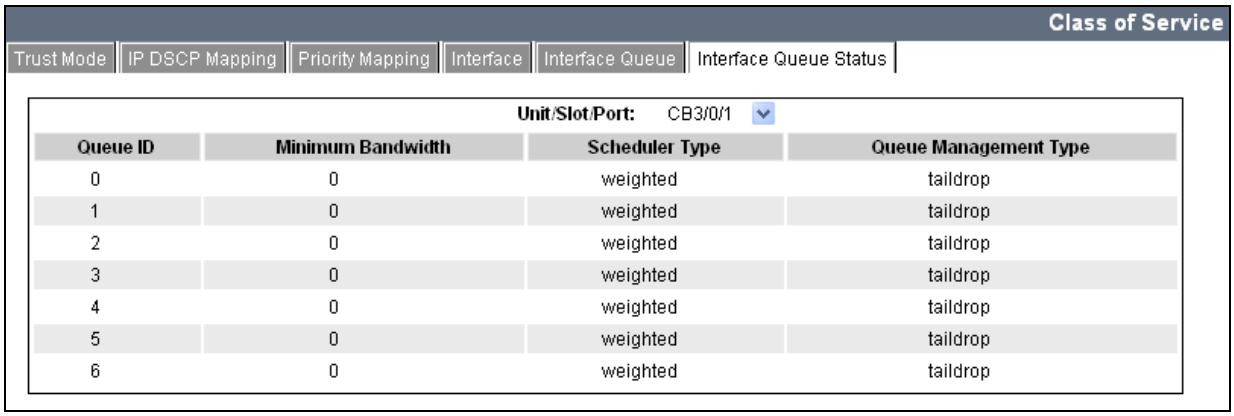
Apply - Send the updated configuration to the IBP. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

8.5.2.6 Interface Queue Status



Queue ID	Minimum Bandwidth	Scheduler Type	Queue Management Type
0	0	weighted	taildrop
1	0	weighted	taildrop
2	0	weighted	taildrop
3	0	weighted	taildrop
4	0	weighted	taildrop
5	0	weighted	taildrop
6	0	weighted	taildrop

Figure : Class of Service Interface Queue Status

Selection Criteria

Unit/Slot/Port - Specifies all CoS configurable interfaces. The option "Global" represents the most recent global configuration settings. These may be overridden on a per-interface basis.

Non-Configurable Data

Queue ID - Specifies the queue ID.

Minimum Bandwidth - Specifies the minimum guaranteed bandwidth allotted to this queue. The value 0 means no guaranteed minimum. Sum of individual Minimum Bandwidth values for all queues in the selected interface cannot exceed defined maximum (100).

Scheduler Type - Specifies the type of scheduling used for this queue. Scheduler Type can only be one of the following:

- strict
- weighted

Queue Management Type - Queue depth management technique used for queues on this interface. This is only used if device supports independent settings per-queue. Queue Management Type can only be one of the following:

- taildrop

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8.6 Stacking Menu

Functions in this menu are provided in stackable Ethernet Connection Blade.

8.6.1 Configuration

8.6.1.1 Unit Config

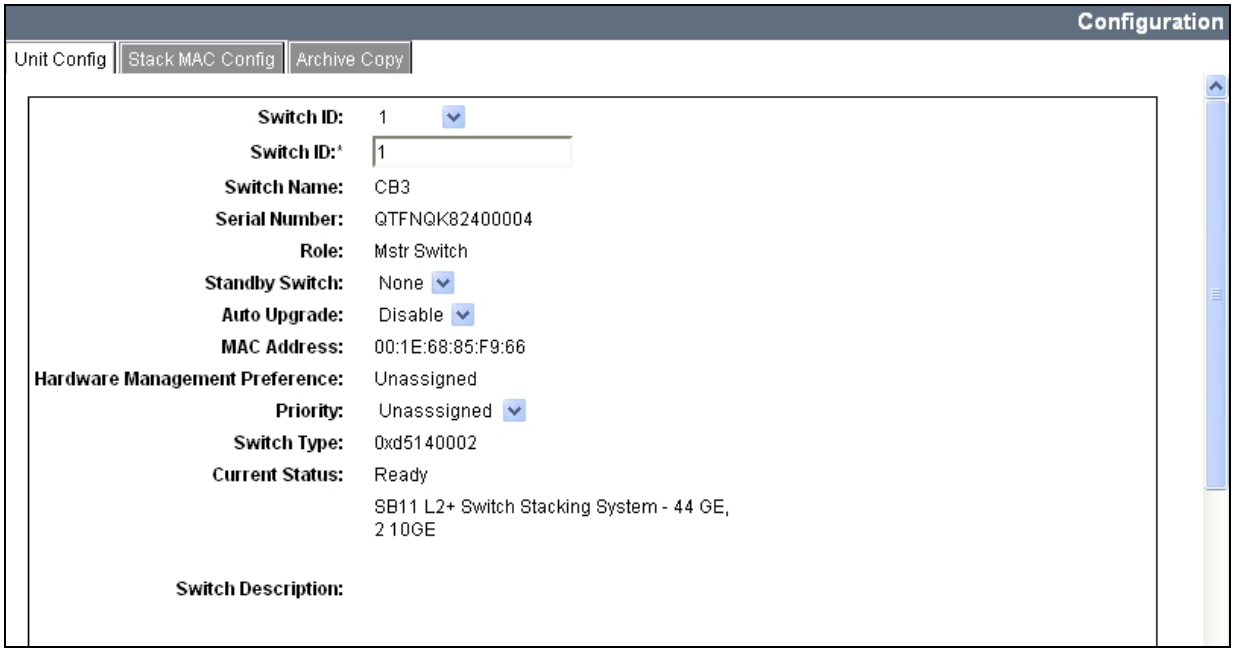

Figure : Stacking Unit Config

Selection Criteria

Switch ID - Displays the list of units of the stack. Details of the selected unit are displayed. There is also a Create option visible only to Admin users which can be used to pre-configure new members of the stack.

Standby Switch - Select a unit in the stack to be the Standby switch. The unit configured as the Standby switch becomes the stack master if the current stack master fails. Select 'None' for auto selection Standby switch by stack master.

Auto Upgrade - To enable or disable the auto upgrade feature on an IBP. When an IBP is wanted to join a stack and its firmware version is lower than the stack master, then auto firmware upgrade will be performed if this feature is enabled on the stack master.

Priority - A two-byte field that indicates whether the administrator wants this unit to become a management unit in preference to another unit. The default value for this setting is one. If the preference level is set to zero then the device cannot become a management unit. This field is non-configurable for users with read-only access.

Configurable Data

Switch ID - Displays the switch ID of the selected IBP in the stack. This can be altered to renumber the switch ID of the selected IBP by admin users. This field is non-configurable for users with read-only access.

Switch Name - Displays the identifier of the selected unit in the stack. This field is non-configurable if this unit is presented.

Non-Configurable Data

Serial Number - Displays the unique box serial number for the IBP.

Role - Displays whether the selected IBP is the master or a slave.

MAC Address - The MAC address of IBP units.

Hardware Management Preference - A two-byte field that indicates whether this unit is capable of becoming the Management Unit. If the value is set to zero then the unit cannot support Management Unit function. The higher value means that the unit is more desirable than another unit with lower value for running the management function. The device manufacturer sets this field.

Switch Type - Identifies the hardware type of the selected unit. This is a 32-bit data field.

Current Status - Displays the status of the selected unit. The possible values are:

- Ready
- Not Ready
- Unsupported
- Code Mismatch
- Mode Mismatch
- Code Updating
- Not Present

Switch Description - Displays a 80-byte data field used to identify the device.

Detected Code Version - Release number and version number of the code detected.

Detected Code in Flash - Displays the Release number and version number of the code stored in flash.

Up Time - Displays the relative time since the last reboot of the IBP.

Command Buttons

Apply - Update the IBP with the values on the screen. If you want the IBP to retain the new values across a power cycle, you must perform a save.

Delete - Removes the selected unit from the stack.

To be Master - Makes the selected unit to be master.

Refresh - Update the information on the page.

8.6.1.2 Stack MAC Config

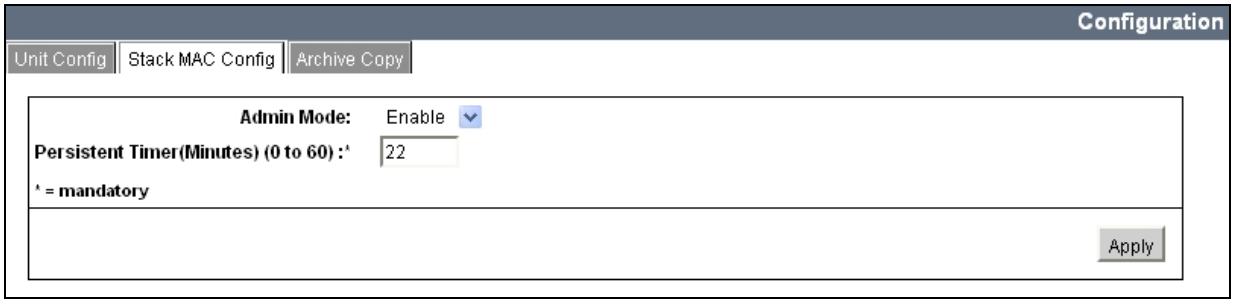

Figure : Stack MAC Config

Selection Criteria

Admin Mode - Select enable or disable from the pull down menu. When you select 'enable', the Stack MAC Persistent Timer function will be enabled.

Configurable Data

Persistent Timer(Minutes) - Set the time period in minutes before the stack MAC address changes to that of the new stack master. The valid range is from 0 to 60.

Command Buttons

Apply - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

i

Stack MAC persistency timer value of 0 means that, after a master switchover, the current stack-mac will continue to be used indefinitely.

If the entire stack reloads, it comes up with the MAC address of the current stack master as the stack MAC address.

8.6.1.3 Archive Copy

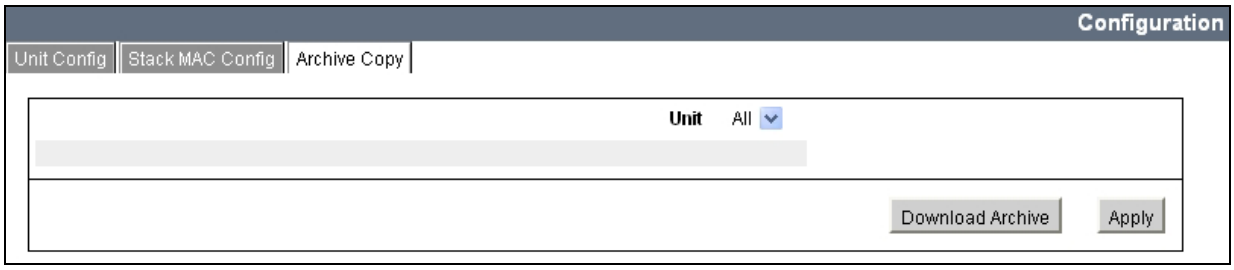

Figure : Stacking Archive Copy

Selection Criteria

Unit - Displays the list of all units of the stack other than the management unit.

Command Buttons

Apply - Copies the code from the management Unit to stack unit(s) specified by the unit selector.

Download Archive - Downloads an archive file to the IBP.

8.6.2 Information

8.6.2.1 Summary

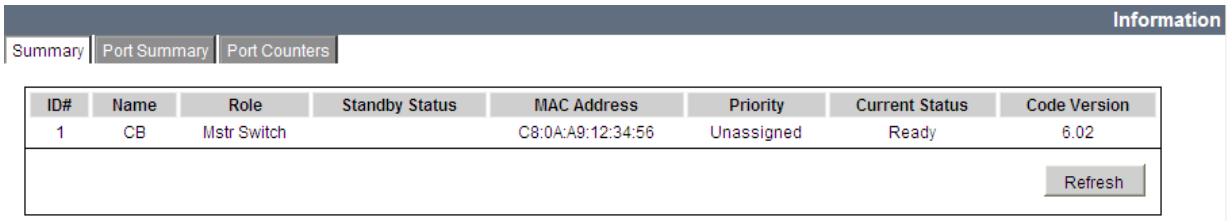

Figure : Stacking Summary

Non-Configurable Data

ID# - Displays the ID of the unit. The maximum number of units allowed in the stack is 8.

Name - Displays the identifier of the unit.

Role - This field indicates whether the unit is a stack master or stack member.

Standby Status - This field indicates the unit that is configured as the Standby unit.

- Oper Standby - Indicates that this unit is operating as the Standby Unit and the configured Standby Unit is not part of the stack.
- Cfg Standby - Indicates that the unit is configured as the Standby Unit. The unit configured as the Standby switch becomes the stack master if the current stack master fails.
- Blank - the switch is not configured as the Standby Unit.

MAC Address - The MAC address of IBP units..

Priority - A two-byte field that indicates whether the administrator wants this unit to become a management unit in preference to another unit. The default value for this setting is 'Unassigned'. If the preference level is set to 'Disable' then the device cannot become a management unit. This field is non-configurable for users with read-only access.

Current Status - This field indicates the unit status. There are eight possible state values:

- Ready
- Not Ready
- Unsupported
- CodeMismatch
- Mode Mismatch
- Code Updating
- NotPresent

Code Version - This field indicates the detected version of code on this unit.

Command Buttons

Refresh - Update the information on the page.

8.6.2.2 Port Summary

Shows the statistics for all the stackable interfaces in the given stack.

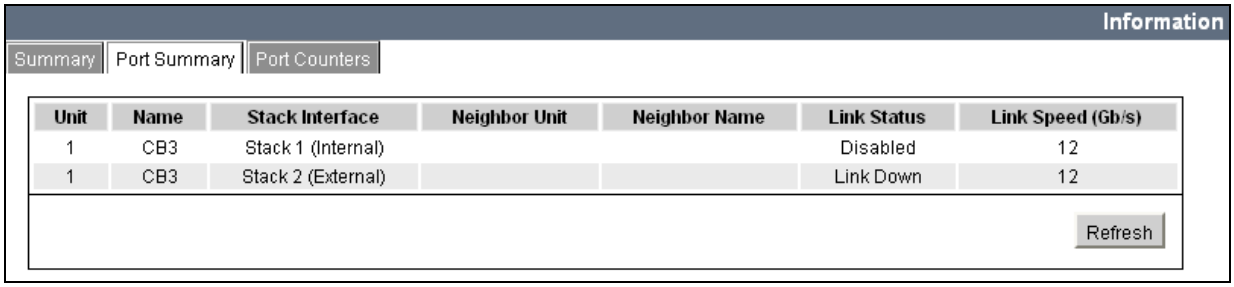

Figure : Stacking Port Summary

Non-Configurable Data

Unit - Displays the unit.

Name – Display the unit name.

Stack Interface - Displays the stackable interfaces on the given unit.

Neighbor Unit - Displays the neighbor unit.

Neighbor Name - Displays the neighbor unit name.

Link Status - Displays the link status (UP/DOWN) of the port.

Link Speed (Gb/s) - Displays the maximum speed of the stacking port.

Command Buttons

Refresh - Refreshes the data on the page.

8.6.2.3 Port Counters

Displays the counters for all the stackable interfaces in the given stack.

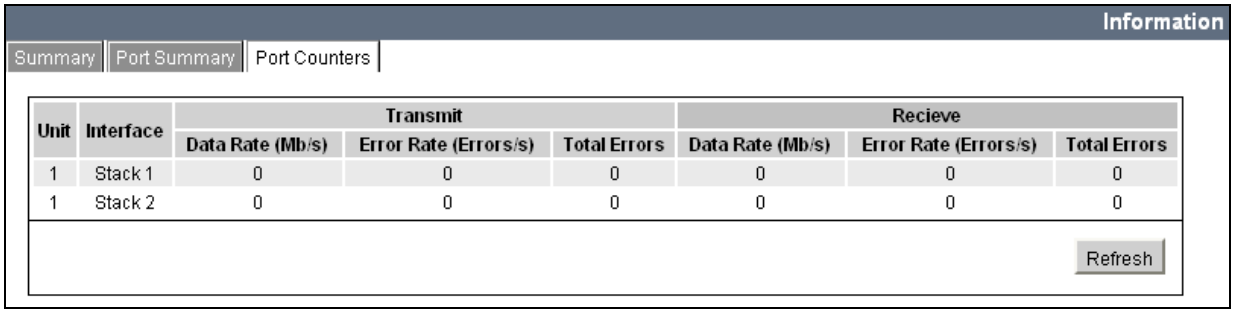

Figure : Stacking Port Counters

Non-Configurable Data

Unit - Displays the unit.

Interface - Displays the stackable interfaces on the given unit.

Transmit and Receive statistics

- **Data Rate (Mb/s)** - Displays the approximate rate on the stacking port.
- **Error Rate (Errors/s)** - Displays an approximate error rate on the stack port.
- **Total Errors** - Displays the total number of errors since boot. The counter may wrap.

Command Buttons

Refresh - Refreshes the data on the page.

9 Command Reference

The Command Line Interface (CLI) syntax, conventions, and terminology are described in this section. Each CLI command is illustrated using the structure outlined below.

9.1 CLI Command Format

Commands are followed by values, parameters, or both.

Example 1

IP address <ipaddr> <netmask> [<gateway>]

- **IP address** is the command name.
- **<ipaddr> <netmask>** are the required values for the command.
- **[<gateway>]** is the optional value for the command.

Example 2

snmp-server host <loc>

- **snmp-server host** is the command name.
- **<loc>** is the required parameter for the command.

Example 3

clear vlan

- **clear vlan** is the command name.

Command

The text in bold, non-italic font must be typed exactly as shown.

9.2 CLI Mode-based Topology

Parameters

Parameters are order dependent.

The text in bold italics should be replaced with a name or number. To use spaces as part of a name parameter, enclose it in double quotes like this: "System Name with Spaces".

Parameters may be mandatory values, optional values, choices, or a combination.

- <parameter>. The <> angle brackets indicate that a mandatory parameter must be entered in place of the brackets and text inside them.
- [parameter]. The [] square brackets indicate that an optional parameter may be entered in place of the brackets and text inside them.
- choice1 | choice2. The | indicates that only one of the parameters should be entered.The {} curly braces indicate that a parameter must be chosen from the list of choices.

Values

ipaddr This parameter is a valid IP address, made up of four decimal bytes ranging from 0 to 255. The default for all IP parameters consists of zeros (that is, 0.0.0.0). The interface IP address of 0.0.0.0 is invalid.

macaddr The MAC address format is six hexadecimal numbers separated by colons, for example 00:06:29:32:81:40.

areaid Area IDs may be entered in dotted-decimal notation (for example, 0.0.0.1). An area ID of 0.0.0.0 is reserved for the backbone. Area IDs have the same form as IP addresses, but are distinct from IP addresses. The IP network number of the sub-netted network may be used for the area ID.

routerid The value of <router id> must be entered in 4-digit dotted-decimal notation (for example, 0.0.0.1). A router ID of 0.0.0.0 is invalid.

slot/port This parameter denotes a valid slot number, and a valid port number. For example, 0/1 represents slot number 0 and port number 1. The <slot/port> field is composed of a valid slot number and a valid port number separated by a forward slash (/).

logical slot/port This parameter denotes logical slot number, and logical port number assigned. This is applicable in the case of a port-channel (LAG). The operator can use the logical logical slot number, and the logical port number to configure the port-channel.

Conventions

Network addresses are used to define a link to a remote host, workstation, or network. Network addresses are shown using the following syntax:

Address Type	Format	Range
IPAddr	A.B.C.D	0.0.0.0 to 255.255.255.255
MacAddr	YY:YY:YY:YY:YY:YY	hexidecimal digit pairs

Table : Network Address Syntax

Double quotation marks such as "System Name with Spaces" set off user defined strings. If the operator wishes to use spaces as part of a name parameter then it must be enclosed in double quotation marks.

Empty strings (““) are not valid user defined strings. Command completion finishes spelling the command when enough letters of a command are typed to uniquely identify the command word. The command may be executed by typing <enter> (command abbreviation) or the command word may be completed by typing the <tab> or <space bar> (command completion).

The value 'Err' designates that the requested value was not internally accessible. This should never happen and indicates that there is a case in the software that is not handled correctly.

The value of '-----' designates that the value is unknown.

Annotations

The CLI allows the user to type single-line annotations at the command prompt for use when writing test or configuration scripts and for better readability. The exclamation point (‘!’) character flags the beginning of a comment. The comment flag character can begin a word anywhere on the command line and all input following this character is ignored. Any command line that begins with the character ‘!’ is recognized as a comment line and ignored by the parser.

Some examples are provided below:

```
! Script file for displaying the ip interface
! Display information about interfaces
show ip interface 1/0/1 !Displays the information about the first interface
! Display information about the next interface
show ip interface 1/0/2
```

! End of the script file

9.3 System Information and Statistic Commands

9.3.1 show arp

This command displays connectivity between the IBP and other devices. The Address Resolution Protocol (ARP) cache identifies the MAC addresses of the IP stations communicating with the IBP.

Syntax
show arp

Default Setting

None

Command Mode

Privileged Exec

Display Message

MAC Address: A unicast MAC address for which the IBP has forwarding and/or filtering information. The format is 6 two-digit hexadecimal numbers that are separated by colons. For example: 00:23:45:67:89:AB

IP Address: The IP address assigned to each interface.

Interface: Valid slot number and a valid port number.

9.3.2 show calendar

This command displays the system clock.

Syntax
show calendar

Default Setting

None

Command Mode

Privileged Exec

Display Message

Current Time: displays system time

9.3.3 show eventlog

This command displays the event log, which contains error messages from the system. The event log will not be cleared on a system reset.

Syntax

show eventlog

Default Setting

None

Command Mode

Privileged Exec

Display Message

File: The file in which the event originated.

Line: The line number of the event.

Task Id: The task ID of the event.

Code: The event code.

Time: The time this event occurred.

Note: Event log information is retained across an IBP reset.

9.3.4 show running-config

This command is used to display/capture the current setting of different protocol packages supported on IBP. This command displays/captures only commands with settings/configurations with values that differ from the default value. The output is displayed in script format, which can be used to configure another IBP with the same configuration.

When a script name is provided, the output is redirected to a configuration script. The option [all] will also enable the display/capture of all commands with settings/configurations that include values that are same as the default values. If the optional <scriptname> is provided with a file name extension of ".scr", the output will be redirected to a script file.

Syntax

show running-config [all] [<scriptname>] [|]

[all] - enable the display/capture of all commands with settings/configurations that include values that are same as the default values.

[<scriptname>] - redirect the output to the file <scriptname>.

[|] - Output modifiers.

Default Setting

None

Command Mode

Privileged Exec

9.3.5 show sysinfo

This command displays IBP brief information and MIBs supported.

Syntax
show sysinfo

Default Setting

None

Command Mode

Privileged Exec

Display Message

System Description: The text used to identify this IBP.

System Name: The name used to identify the IBP.

System Location: The text used to identify the location of the IBP. May be up to 31 alpha-numeric characters. The factory default is blank.

System Contact: The text used to identify a contact person for this IBP. May be up to 31 alphanumeric characters. The factory default is blank.

System Object ID: The manufacturing ID.

System Up Time: The time in days, hours and minutes since the last IBP reboot.

Current SNTP Synchronized Time: The time is synchronized with SNTP server or not.

MIBs Supported: A list of MIBs supported by this agent.

9.3.6 show system

This command displays IBP system information.

Syntax

show system

Default Setting

None

Command Mode

Privileged Exec

Display Message

System Description: Text used to identify this IBP.

System Object ID: The manufacturing ID

System Information

System Up Time: The time in days, hours and minutes since the last IBP reboot.

System Name: Name used to identify the IBP.

System Location: Text used to identify the location of the IBP. May be up to 31 alpha-numeric characters. The factory default is blank.

System Contact: Text used to identify a contact person for this IBP. May be up to 31 alphanumeric characters. The factory default is blank.

MAC Address: The burned in MAC address used for in-band connectivity.

Operational MAC Address: The MAC address currently used for in-band connectivity.

Web Server: Displays to enable/disable web server function

Web Server Port: Displays the web server http port

Web Server Java Mode: Specifies if the IBP should allow access to the Java applet in the header frame. Enabled means the applet can be viewed. The factory default is disabled.

Protocol Current: Indicates which network protocol is being used. The options are bootp | dhcp | none.

DHCP Client Identifier TEXT: DCHP client identifier for this IBP.

9.3.7 show hardware

This command displays inventory information for the IBP.

Syntax
show hardware

Default Setting

None

Command Mode

Privileged Exec

Display Message

System Description: Text used to identify the product name of this IBP.

Machine Type: Specifies the machine model as defined by the Vital Product Data.

Machine Model: Specifies the machine model as defined by the Vital Product Data.

Serial Number: The unique box serial number for this IBP.

Label Revision Number: The label revision serial number of this IBP is used for manufacturing purposes.

Part Number: Manufacturing part number.

Hardware Version: The hardware version of this IBP. It is divided into four parts. The first byte is the major version and the second byte represents the minor version.

Loader Version: The release version maintenance number of the loader code currently running on the IBP. For example, if the release was 1, the version was 2, the format would be '1.2'.

Boot Rom Version: The release version maintenance number of the boot ROM code currently running on the IBP. For example, if the release was 1, the version was 2, the format would be '1.2'.

Operating Code Version: The release version maintenance number of the code currently running on the IBP. For example, if the release was 1, the version was 2, the format would be '1.2'.

Note: below information will be displayed when you plug in SFP/SFP+ module.

Module 1 : The detected module type, for example, SFP or SFP+.

Status: The status of this detected module, for example, OK or Not Supported.

Gigabit Ethernet Compliance Codes: The SFP/SFP+ transceiver vendor name shall be the full name of the corporation, a commonly accepted abbreviation of the name of the corporation, the SCSI company code for the corporation, or the stock exchange code for the corporation.

Vendor Name: The name of manufacturing vendor.

Vendor Part Number: Part number provided by SFP+ transceiver vendor.

Vendor Serial Number: Serial number provided by vendor.

Vendor Revision Number: Revision level for part number provided by vendor.

Vendor Manufacturing Date: The vendor’s manufacturing date.

Additional Packages: This displays the additional packages that are incorporated into this system.

9.3.8 show version

This command displays version information for the IBP.

Syntax
show version

Default Setting

None

Command Mode

Privileged Exec

Display Message

Serial Number: The unique box serial number for this IBP.

Hardware Version: The hardware version of this IBP. It is divided into four parts. The first byte is the major version and the second byte represents the minor version.

Number of ports: Indicate how many physical port on the IBP.

Label Revision Number: The label revision serial number of this IBP is used for manufacturing purpose.

Part Number: Manufacturing part number.

Machine Model: The model within the machine type.

Loader Version: The release version maintenance number of the loader code currently running on the IBP. For example, if the release was 1, the version was 2, the format would be '1.2'.

Operating Code Version: The release version maintenance number of the code currently running on the IBP. For example, if the release was 1, the version was 2, the format would be '1.2'.

Boot Rom Version: The release version maintenance number of the boot rom code currently running on the IBP. For example, if the release was 1, the version was 2, the format would be '1.2'.

9.3.9 show tech-support

This command displays IBP information needed for trouble-shooting.

Syntax

show tech-support

Default Setting

None

Command Mode

Privileged Exec

9.3.10 show loginsession

This command displays current telnet and serial port connections to the IBP.

Syntax

show loginsession

Default Setting

None

Command Mode

Privileged Exec

Display Message

ID: Login Session ID

User Name: The name the user will use to login using the serial port or Telnet. A new user may be added to the IBP by entering a name in a blank entry. The user name may be up to 8 characters, and is not case sensitive. Two users are included as the factory default, admin, and guest.

Connection From: IP address of the telnet client machine or EIA-232 for the serial port connection.

Idle Time: Time this session has been idle.

Session Time: Total time this session has been connected.

Session Type: Shows the type of session: telnet, serial or SSH.

9.4 Device Configuration Commands

9.4.1 Interface

9.4.1.1 show interface status

This command displays the Port monitoring information for the system.

Syntax
show interface status {<slot/port> | all}

<slot/port> - is the desired interface number.

all - This parameter displays information for all interfaces.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Intf: The physical slot and physical port.

Type: If not blank, this field indicates that this port is a special type of port. The possible values are:

Source - This port is a monitoring port.

PC Mbr - This port is a member of a port-channel (LAG).

Dest - This port is a probe port.

Admin Mode: Selects the Port control administration state. The port must be enabled in order for it to be allowed into the network. – It may be enabled or disabled. The factory default is enabled.

E-Keying Status: Indicates the E-Keying Status.

Physical Mode: Selects the desired port speed and duplex mode. If auto-negotiation support is selected, then the duplex mode and speed will be set from the auto-negotiation process. Note that the port's maximum capability (full duplex -100M) will be advertised. Otherwise, this object will determine the port's duplex mode and transmission rate. The factory default is Auto.

Physical Status: Indicates the port speed and duplex mode.

Link Status: Indicates whether the Link is up or down.

Link Trap: This object determines whether to send a trap when link status changes. The factory default is enabled.

Flow Mode: Displays flow control mode.

Capabilities Status: Displays interface capabilities.

9.4.1.2 show interface counters

This command displays a summary of statistics for a specific interface or all interfaces.

Syntax
show interface counters {<slot/port> | all}

<slot/port> - is the desired interface number.

all - This command displays statistics information for all interfaces.

Default Setting

None

Command Mode

Privileged Exec

Display Message

The display parameters when the argument is '<slot/port>' are as follows:

Packets Received Without Error: The total number of packets (including broadcast packets and multicast packets) received by the processor.

Packets Received With Error: The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.

Broadcast Packets Received: The total number of packets received that were directed to the broadcast address. Note that this does not include multicast packets.

Packets Transmitted Without Error: The total number of packets transmitted out of the interface.

Transmit Packets Errors: The number of outbound packets that could not be transmitted because of errors.

Transmit Packets Discarded: The best estimate of the total number of collisions on this Ethernet segment.

Time Since Counters Last Cleared: The elapsed time, in days, hours, minutes, and seconds since the statistics for this port were last cleared.

The display parameters when the argument is 'all' are as follows:

Interface: The physical slot and physical port or the logical slot and logical port.

Summary: The summation of the statistics of all ports.

Packets Received Without Error: The total number of packets (including broadcast packets and multicast packets) received.

Packets Received With Error: The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.

Broadcast Packets Received: The total number of packets received that were directed to the broadcast address. Note that this does not include multicast packets.

Packets Transmitted Without Error: The total number of packets transmitted.

Transmit Packets Errors: The number of outbound packets that could not be transmitted because of errors.

Transmit Packets Discarded: The best estimate of the total number of collisions on this Ethernet segment.

This command displays detailed statistics for a specific port or for all CPU traffic based upon the argument.

Syntax

show interface counters detailed {<slot/port> | switchport}

<slot/port> - is the desired interface number.

switchport - This parameter specifies whole IBP or all interfaces.

Default Setting

None

Command Mode

Privileged Exec

Display Message

The display parameters when the argument is ' <slot/port>' are as follows:

Total Packets Received (Octets): The total number of octets of data (including those in bad packets) received on the network (excluding framing bits but including FCS octets). This object can be used as a reasonable estimate of Ethernet utilization. If greater precision is desired, the etherStatsPkts and etherStatsOctets objects should be sampled before and after a common interval. The result of this equation is the value Utilization which is the percent utilization of the Ethernet segment on a scale of 0 to 100 percent.

Packets Received 64 Octets: The total number of packets (including bad packets) received that were 64 octets in length (excluding framing bits but including FCS octets).

Packets Received 65-127 Octets: The total number of packets (including bad packets) received that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Received 128-255 Octets: The total number of packets (including bad packets) received that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Received 256-511 Octets: The total number of packets (including bad packets) received that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Received 512-1023 Octets: The total number of packets (including bad packets) received that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Received 1024-1518 Octets: The total number of packets (including bad packets) received that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Received > 1522 Octets: The total number of packets received that were longer than 1522 octets (excluding framing bits, but including FCS octets) and were otherwise well formed.

Packets RX and TX 64 Octets: The total number of packets (including bad packets) received that were 64 octets in length (excluding framing bits but including FCS octets).

Packets RX and TX 65-127 Octets: The total number of packets (including bad packets) received that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 128-255 Octets: The total number of packets (including bad packets) received that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 256-511 Octets: The total number of packets (including bad packets) received that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 512-1023 Octets: The total number of packets (including bad packets) received that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 1024-1518 Octets: The total number of packets (including bad packets) received that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 1519-2047 Octets: The total number of packets (including bad packets) received that were between 1519 and 1522 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 2048-4095 Octets: The total number of packets (including bad packets) received that were between 2048 and 4095 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 4096-9216 Octets: The total number of packets (including bad packets) received that were between 4096 and 9216 octets in length inclusive (excluding framing bits but including FCS octets).

Total Packets Received Without Errors

Unicast Packets Received: The number of unicast packets delivered to a higher-layer protocol.

Multicast Packets Received: The total number of good packets received that were directed to a multicast address. Note that this number does not include packets directed to the broadcast address.

Broadcast Packets Received: The total number of good packets received that were directed to the broadcast address. Note that this does not include multicast packets.

Total Packets Received with MAC Errors

Jabbers Received: The total number of packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error). Note that this definition of jabber is different than the definition in IEEE-802.3 section 8.2.1.5 (10BASE5) and section 10.3.1.4 (10BASE2). These documents define jabber as the condition where any packet exceeds 20 ms. The allowed range to detect jabber is between 20 ms and 150 ms.

Undersize Received: The total number of packets received that were less than 64 octets in length with GOOD CRC(excluding framing bits but including FCS octets).

Fragments Received: The total number of packets received that were less than 64 octets in length with ERROR CRC(excluding framing bits but including FCS octets).

Alignment Errors: The total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had a bad FCS with a non-integral number of octets.

FCS Errors: The total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had a bad FCS with an integral number of octets

Overruns: The total number of frames discarded as this port was overloaded with incoming packets, and could not keep up with the inflow.

MTU Errors: The total number of frames discarded as this port was bigger than MTU with incoming packets.

Total Packets Received with MAC Errors

Total Packets Transmitted (Octets)

Packets Transmitted 64 Octets: The total number of packets (including bad packets) received that were 64 octets in length (excluding framing bits but including FCS octets).

Packets Transmitted 65-127 Octets: The total number of packets (including bad packets) received that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Transmitted 128-255 Octets: The total number of packets (including bad packets) received that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Transmitted 256-511 Octets: The total number of packets (including bad packets) received that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Transmitted 512-1023 Octets: The total number of packets (including bad packets) received that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Transmitted 1024-1518 Octets: The total number of packets (including bad packets) received that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).

Max Frame Size: Display the maximum frame size.

Total Packets Transmitted Successfully

Unicast Packets Transmitted: The total number of packets that higher-level protocols requested be transmitted to a unicast address, including those that were discarded or not sent.

Multicast Packets Transmitted: The total number of packets that higher-level protocols requested be transmitted to a Multicast address, including those that were discarded or not sent.

Broadcast Packets Transmitted: The total number of packets that higher-level protocols requested be transmitted to the Broadcast address, including those that were discarded or not sent.

Tx Oversized: The total number of frames that exceeded the max permitted frame size. This counter has a max increment rate of 815 counts per sec. at 10 Mb/s.

Total Transmit Errors

FCS Errors: The total number of packets transmitted that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had a bad FCS with an integral number of octets

Underrun Errors: The total number of frames discarded because the transmit FIFO buffer became empty during frame transmission.

Total Transmitted Packets Discards

Single Collision Frames: A count of the number of successfully transmitted frames on a particular interface for which transmission is inhibited by exactly one collision.

Multiple Collision Frames: A count of the number of successfully transmitted frames on a particular interface for which transmission is inhibited by more than one collision.

Excessive Collisions: A count of frames for which transmission on a particular interface fails due to excessive collisions.

Time Since Counters Last Cleared: The elapsed time, in days, hours, minutes, and seconds since the statistics for this port were last cleared.

The display parameters when the argument is ‘switchport’ are as follows:

Total Packets Received (Octets): The total number of octets of data received by the processor (excluding framing bits but including FCS octets).

Packets Received Without Error: The total number of packets (including broadcast packets and multicast packets) received by the processor.

Unicast Packets Received: The number of unicast packets delivered to a higher-layer protocol.

Multicast Packets Received: The total number of packets received that were directed to a multicast address. Note that this number does not include packets directed to the broadcast address.

Broadcast Packets Received: The total number of packets received that were directed to the broadcast address. Note that this does not include multicast packets.

Receive Packets Discarded: The number of inbound packets which were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol. A possible reason for discarding a packet could be to free up buffer space.

Octets Transmitted: The total number of octets transmitted out of the interface, including framing characters.

Packets Transmitted without Errors: The total number of packets transmitted out of the interface.

Unicast Packets Transmitted: The total number of packets that higher-level protocols requested be transmitted to a subnetwork-unicast address, including those that were discarded or not sent.

Multicast Packets Transmitted: The total number of packets that higher-level protocols requested be transmitted to a Multicast address, including those that were discarded or not sent.

Broadcast Packets Transmitted: The total number of packets that higher-level protocols requested be transmitted to the Broadcast address, including those that were discarded or not sent.

Transmit Packets Discarded: The number of outbound packets which were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol. A possible reason for discarding a packet could be to free up buffer space.

Most Address Entries Ever Used: The highest number of Forwarding Database Address Table entries that have been learned by this IBP since the most recent reboot.

Address Entries Currently in Use: The number of Learned and static entries in the Forwarding Database Address Table for this IBP.

Maximum VLAN Entries: The maximum number of Virtual LANs (VLANs) allowed on this IBP.

Most VLAN Entries Ever Used: The largest number of VLANs that have been active on this IBP since the last reboot.

Static VLAN Entries: The number of presently active VLAN entries on this IBP that have been created statically.

Dynamic VLAN Entries: The number of presently active VLAN entries on this IBP that have been created by GVRP registration.

VLAN Deletes: The number of VLANs on this IBP that have been created and then deleted since the last reboot.

Time Since Counters Last Cleared: The elapsed time, in days, hours, minutes, and seconds, since the statistics for this IBP were last cleared.

9.4.1.3 show interface IBP

This command displays a summary of statistics for all CPU traffic.

Syntax
show interface IBP

Default Setting

None

Command Mode

Privileged Exec

Display Message

Packets Received Without Error: The total number of packets (including broadcast packets and multicast packets) received by the processor.

Broadcast Packets Received: The total number of packets received that were directed to the broadcast address. Note that this does not include multicast packets.

Packets Received With Error: The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.

Packets Transmitted Without Error: The total number of packets transmitted out of the interface.

Broadcast Packets Transmitted: The total number of packets that higher-level protocols requested to be transmitted to the Broadcast address, including those that were discarded or not sent.

Transmit Packet Errors: The number of outbound packets that could not be transmitted because of errors.

Address Entries Currently In Use: The total number of Forwarding Database Address Table entries now active on the IBP, including learned and static entries.

Time Since Counters Last Cleared: The elapsed time, in days, hours, minutes, and seconds since the statistics for this IBP were last cleared.

9.4.1.4 interface

This command is used to enter Interface configuration mode.

Syntax

interface <slot/port>

<slot/port> - is the desired interface number.

Default Setting

None

Command Mode

Global Config

9.4.1.5 interface range

This command is used to enter Interface range configuration mode.

Syntax

interface range {<slot/port> [- <slot/port>]} [, {<slot/port> [- <slot/port>]} [, {<slot/port> [- <slot/port>]} [, {<slot/port> [- <slot/port>]} [, {<slot/port> [- <slot/port>]}]]]]

<slot/port> - is the desired interface number.

Default Setting

None

Command Mode

Global Config

9.4.1.6 speed-duplex

This command is used to set the speed and duplex mode for the interface.

Syntax

```
speed-duplex {10 | 100} {full-duplex | half-duplex}
```

100 - 100BASE-T

10 - 10BASE-T

full-duplex - Full duplex

half-duplex - Half duplex

Default Setting

None

Command Mode

Interface Config

This command is used to set the speed and duplex mode for all interfaces.

Syntax

```
speed-duplex all {10 | 100} {full-duplex | half-duplex}
```

100 - 100BASE-T

10 - 10BASE-T

full - duplex - Full duplex

half - duplex - Half duplex

all - This command represents all interfaces.

Default Setting

None

Command Mode

Global Config

9.4.1.7 negotiate

This command enables automatic negotiation on a port. The default value is enabled.

Syntax
negotiate no negotiate

no - This command disables automatic negotiation on a port.

Default Setting

Enable

Command Mode

Interface Config

This command enables automatic negotiation on all interfaces. The default value is enabled.

Syntax
negotiate all no negotiate all

all - This command represents all interfaces.

no - This command disables automatic negotiation on all interfaces.

Default Setting

Enable

Command Mode

Global Config

9.4.1.8 capabilities

This command is used to set the capabilities on specific interface.

Syntax

```
capabilities {{10 | 100 } {full-duplex | half-duplex}} | {1000 full-duplex }
no capabilities {{10 | 100 } {full-duplex | half-duplex}} | {1000 full-duplex }
```

10 - 10BASE-T

100 - 100BASE-T

1000 - 1000BASE-T

full-duplex - Full duplex

half-duplex - Half duplex

no - This command removes the advertised capability with using parameter.

Default Setting

10 half-duplex, 10 full-duplex, 100 half-duplex, 100 full-duplex, and 1000 full-duplex

Command Mode

Interface Config

This command is used to set the capabilities on all interfaces.

Syntax

```
capabilities all {{10 | 100} {full-duplex | half-duplex}} | {1000 full-duplex }
no capabilities all {{10 | 100} {full-duplex | half-duplex}} | {1000 full-duplex }
```

10 - 10BASE-T

100 - 100BASE-T

1000 - 1000BASE-T

full-duplex - Full duplex

half-duplex - Half duplex

all - This command represents all interfaces.

no - This command removes the advertised capability with using parameter

Default Setting

10 half-duplex, 10 full-duplex, 100 half-duplex, 100 full-duplex, and 1000 full-duplex

Command Mode

Global Config

9.4.1.9 storm-control flowcontrol

This command enables 802.3x flow control for the IBP.

Note: This command only applies to full-duplex mode ports.

Syntax

```
storm-control flowcontrol
no storm-control flowcontrol
```

no - This command disables 802.3x flow control for the IBP.

Default Setting

Disabled

Command Mode

Global Config

This command enables 802.3x flow control for the specific interface.

Note: This command only applies to full-duplex mode ports.

Syntax

```
storm-control flowcontrol
no storm-control flowcontrol
```

no - This command disables 802.3x flow control for the specific interface.

Default Setting

Disabled

Command Mode

Interface Config

9.4.1.10 shutdown

This command is used to disable a port.

Syntax
shutdown no shutdown

no - This command enables a port.

Default Setting

Enabled

Command Mode

Interface Config

This command is used to disable all ports.

Syntax
shutdown all no shutdown all

all - This command represents all ports.

no - This command enables all ports.

Default Setting

Enabled

Command Mode

Global Config

9.4.1.11 MDI/MDIX

This command is used to configure the MDI/MDIX mode of the physical port.

Syntax

```
mdi {auto | across | normal}
no mdi
```

auto - MDI force-auto mode

across - MDI across mode

normal - MDI normal mode

no - This command restore mdi to default setting.

Default Setting

Normal

Command Mode

Interface Config

9.4.2 L2 MAC Address and Multicast Forwarding Database Tables

9.4.2.1 show mac-addr-table

This command displays the forwarding database entries. If the command is entered with no parameter, the entire table is displayed. This is the same as entering the optional **all** parameter. Alternatively, the administrator can enter a MAC Address to display the table entry for the requested MAC address and all entries following the requested MAC address.

Syntax
show mac-addr-table [{<macaddr> < vlanid >|all}]

<macaddr> - enter a MAC Address to display the table entry for the requested MAC address.

<vlanid> - VLAN ID (Range: 1 – 4094)

all – this command displays the entire table.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Mac Address: A unicast MAC address for which the IBP has forwarding and/or filtering information. The format is 6 or 8 two-digit hexadecimal numbers that are separated by colons, for example 01:23:45:67:89:AB. In an IVL system the MAC address will be displayed as 8 bytes. In an SVL system, the MAC address will be displayed as 6 bytes. **Note: This software version only supports IVL systems.**

Interface: The port on which this L2 MAC address was learned.

if Index: This object indicates the if Index of the interface table entry associated with this port.

Status: The status of this entry.

The meanings of the values are:

Static - The value of the corresponding instance was added by the system or a user when a static MAC filter was defined. It cannot be relearned.

Learned - The value of the corresponding instance was learned by observing the source MAC addresses of incoming traffic, and is currently in use.

Management - The value of the corresponding instance (system MAC address) is also the value of an existing instance of dot1dStaticAddress. It is identified with interface 3/1 and is currently used when enabling VLANs for routing.

Self - The value of the corresponding instance is the address of one of the IBP's physical interfaces (the system's own MAC address).

GMRP Learned - The value of the corresponding instance was learned via GMRP and applies to Multicast.

Other - The value of the corresponding instance does not fall into one of the other categories.

9.4.2.2 show mac-addr-table count

This command displays the total forwarding database entries, the number of static and learnning MAC address, and the max address available on the IBP.

Syntax

show mac-addr-table count

Default Setting

None

Command Mode

Privileged Exec

Display Message

Dynamic Address count: The total learning MAC addresses on the L2 MAC address Table.

Static Address (User-defined) count: The total user-defined addresses on the L2 MAC address Table.

Total MAC Addresses in use: This number of addresses are used on the L2 MAC address table.

Total MAC Addresses available: The IBP supports max value on the L2 MAC address table.

9.4.2.3 show mac-addr-table interface

This command displays the forwarding database entries. The user can search FDB table by using interface number <slot/port>.

Syntax

show mac-addr-table interface <slot/port>

<slot/port> - Interface number.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Mac Address: A unicast MAC address for which the IBP has forwarding and/or filtering information. The format is 6 or 8 two-digit hexadecimal numbers that are separated by colons, for example 01:23:45:67:89:AB. In an IVL system the MAC address will be displayed as 8 bytes. In an SVL system, the MAC address will be displayed as 6 bytes. **Note: This software version only supports IVL systems.**

VLAN ID: The VLAN ID of that MAC address.

Status: The status of this entry.

The meanings of the values are:

Static - The value of the corresponding instance was added by the system or a user when a static MAC filter was defined. It cannot be relearned.

Learned - The value of the corresponding instance was learned by observing the source MAC addresses of incoming traffic, and is currently in use.

Management - The value of the corresponding instance (system MAC address) is also the value of an existing instance of dot1dStaticAddress. It is identified with interface 3/1 and is currently used when enabling VLANs for routing.

Self - The value of the corresponding instance is the address of one of the IBP's physical interfaces (the system's own MAC address).

GMRP Learned - The value of the corresponding instance was learned via GMRP and applies to Multicast.

Other - The value of the corresponding instance does not fall into one of the other categories.

9.4.2.4 show mac-addr-table vlan

This command displays the forwarding database entries. The user can search FDB table by using vlan id.

Syntax

```
show mac-addr-table vlan <vlanid>
```

<vlanid> - VLAN ID (Range: 1 – 4094)

Default Setting

None

Command Mode

Privileged Exec

Display Message

Mac Address: A unicast MAC address for which the IBP has forwarding and/or filtering information. The format is 6 or 8 two-digit hexadecimal numbers that are separated by colons, for example 01:23:45:67:89:AB. In an IVL system the MAC address will be displayed as 8 bytes. In an SVL system, the MAC address will be displayed as 6 bytes. **Note: This software version only supports IVL systems.**

Interface: The port on which this L2 MAC address was learned.

Status: The status of this entry.

The meanings of the values are:

Static - The value of the corresponding instance was added by the system or a user when a static MAC filter was defined. It cannot be relearned.

Learned - The value of the corresponding instance was learned by observing the source MAC addresses of incoming traffic, and is currently in use.

Management - The value of the corresponding instance (system MAC address) is also the value of an existing instance of dot1dStaticAddress. It is identified with interface 3/1 and is currently used when enabling VLANs for routing.

Self - The value of the corresponding instance is the address of one of the IBP's physical interfaces (the system's own MAC address).

Other - The value of the corresponding instance does not fall into one of the other categories.

9.4.2.5 show mac-addr-table agetime

This command displays the forwarding database address aging timeout.

Syntax

```
show mac-addr-table agetime
```

Default Setting

None

Command Mode

Privileged Exec

Display Message

Address Aging Timeout: This displays the total number of seconds for Forwarding Database table.

9.4.2.6 mac-addr-table aging-time

This command configures the forwarding database address aging timeout in seconds.

Syntax

```
mac-addr-table aging-time <10-1000000>
no mac-addr-table aging-time
```

<10-1000000> - aging-time (Range: 10-1000000) in seconds

no - This command sets the forwarding database address aging timeout to 300 seconds.

Default Setting

300

Command Mode

Global Config

9.4.2.7 show mac-address-table multicast

This command displays the MFDB information. If the command is entered with no parameter, the entire table is displayed. This is the same as entering the *all* parameter. The user can display the table entry for one MAC Address by specifying the MAC address as an optional parameter.

Syntax

show mac-address-table multicast {<macaddr> <vlanid> | all }

<macaddr> - enter a MAC Address to display the table entry for the requested MAC address

<vlanid> - VLAN ID (Range: 1 – 4094)

all – This command displays the entire table.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Mac Address: A unicast MAC address for which the IBP has forwarding and/or filtering information. The format is 6 or 8 two-digit hexadecimal numbers that are separated by colons, for example 01:23:45:67:89:AB. In an IVL system the MAC address will be displayed as 8 bytes. In an SVL system, the MAC address will be displayed as 6 bytes. **Note: This software version only supports IVL systems.**

Type: This displays the type of the entry. Static entries are those that are configured by the end user. Dynamic entries are added to the table as a result of a learning process or protocol.

Source: The component that is responsible for this entry in the Multicast Forwarding Database. Possible values are IGMP Snooping, GMRP, and Static Filtering.

Description: The text description of this multicast table entry.

Interfaces: The list of interfaces that are designated for forwarding (Fwd:) and filtering (Flt:).

Forwarding Interfaces: The resultant forwarding list is derived from combining all the component's forwarding interfaces and removing the interfaces that are listed as the static filtering interfaces.

9.4.2.8 show mac-address-table stats

This command displays the MFDB statistics.

Syntax
show mac-address-table stats

Default Setting

None

Command Mode

Privileged Exec

Display Message

Max MFDB Table Entries: This displays the total number of entries that can possibly be in the MFDB.

Most MFDB Entries Since Last Reset: This displays the largest number of entries that have been present in the Multicast Forwarding Database table. This value is also known as the MFDB high-water mark.

Current Entries: This displays the current number of entries in the Multicast Forwarding Database table.

9.4.3 IGMP / MLD Snooping

9.4.3.1 Show Commands

9.4.3.1.1 show igmpsnooping

This command displays IGMP / MLD Snooping information. Configured information is displayed whether or not IGMP Snooping is enabled. Status information is only displayed when IGMP Snooping is enabled.

Syntax

show igmpsnooping [<uplinkSetName>]

<uplinkSetName> - The name of uplink set which user want to display.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Uplink Set Name: This indicates the name of uplink set.

Igmp snooping: This displays the admin mode of IGMP snooping.

9.4.3.2 Configuration Commands

9.4.3.2.1 igmpsnooping

To enable the igmp snooping function for the uplink set and its associated groups.

Syntax

```
igmpsnooping <uplinkSetName>
no igmpsnooping <uplinkSetName>
```

<uplinkSetName> - The name of uplink set which user want to configure.

no – This command disables IGMP snooping on specified uplink set.

Default Setting

None

Command Mode

Global Config

9.4.4 Port Channel

9.4.4.1 show port-channel

This command displays the static capability of all downlink port-channels (LAGs) on the device as well as a summary of individual port-channels.

Syntax

show port-channel

Default Setting

None

Command Mode

Privileged Exec

Display Message

Static Capability: This field displays whether or not the device has static capability enabled.

For each port-channel the following information is displayed:

Logical Interface: The field displays logical slot and the logical port.

Port-Channel Name: This field displays the name of the port-channel.

Link State: This field indicates whether the link is up or down.

Mbr Ports: This field lists the ports that are members of this port-channel, in slot/port notation.

Active Ports: This field lists the ports that are actively participating in this port-channel.

This command displays an overview of all downlink port-channels (LAGs) on the IBP.

Syntax

show port-channel {<slot/port> | all}

<slot/port> - Port-Channel Interface number.

all – all Port-Channel interfaces.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Log. Intf: The logical slot and the logical port.

Port-Channel Name: The name of this port-channel (LAG). You may enter any string of up to 15 alphanumeric characters.

Link : Indicates whether the Link is up or down.

Admin Mode: May be enabled or disabled. The factory default is enabled.

Link Trap Mode: This object determines whether or not to send a trap when link status changes. The factory default is enabled.

Mbr Ports: A listing of the ports that are members of this port-channel (LAG), in slot/port notation. There can be a maximum of eight ports assigned to a given port-channel (LAG).

Port Speed: Speed of the port-channel port.

Type: This field displays the status designating whether a particular port-channel (LAG) is statically or dynamically maintained. The possible values of this field are Static, indicating that the port-channel is statically maintained; and Dynamic, indicating that the port-channel is dynamically maintained.

Port Active: This field lists the ports that are actively participating in the port-channel (LAG).

9.4.4.2 show lacp

This command displays the static capability of all uplink set on the IBP.

Syntax
show lacp [<uplinkSetName>]

Default Setting

None

Command Mode

Privileged Exec

Display Message

Uplink Set Name: This field displays the name of a uplink set.

LACP: This field displays whether or not the port-channel of the uplink set has static capability enabled.

9.4.4.3 show lacp interface

This command displays a summary of LACP states for a specific interface or all interfaces.

Syntax

show lacp interface {<slot/port> | all}

Default Setting

None

Command Mode

Privileged Exec

Display Message

Intf: Display interface number.

Role: Role played by the interface. It can be one of the following:

- Actor: Local device participating in LACP negotiation.
- Partner: Remote device participating in LACP negotiation.

Exp: Expired state. **Yes** indicates the actor or partner is in an expired state. **No** indicates the actor or partner is not in an expired state.

Def: Default. **Yes** indicates that the actor's receive machine is using the default operational partner information, administratively configured for the partner. **No** indicates the operational partner information in use has been received in an LACP PDU.

Dist: Distribution of outgoing frames. **No** indicates distribution of outgoing frames on the link is currently disabled and is not expected to be enabled. Otherwise, the value is **Yes**.

Col: Collection of incoming frames.**Yes** indicates collection of incoming frames on the link is currently enabled and is not expected to be disabled. Otherwise, the value is **No**.

Syn: Synchronization. If the value is **Yes**, the link is considered "in synch". It has been allocated to the correct link aggregation group, the group has been associated with a compatible aggregator, and the identity of the link aggregation group is consistent with the system ID and operational key information transmitted. If the value is **No**, the link is currently "out of synch", not in the right aggregation

Aggr: Ability of aggregation port to Aggregate (**Yes**) or to operate only as an individual link (**No**).

Timeout: LACP timeout preference. Periodic transmissions of LACP PDUs occur at either a slow or fast transmission rate, depending upon the expressed LACP timeout preference (**Long** Timeout or **Short** Timeout).

Activity: Actor or partner's port activity. **Passive** indicates the port's preference for not transmitting LAC PDUs unless its partner's control value is Active. **Active** indicates the port's preference to participate in the protocol regardless of the partner's control value.

9.4.4.4 port-channel

This command configures a new port-channel (LAG) and generates a logical slot and port number for it.

Note: Before including a port in a port-channel, set the port physical mode. See '**speed-duplex**' command.

Syntax

```
port-channel <name>
no port-channel {<slot/port> | all}
```

<logical slot/port> - Port-Channel Interface number.

<name> - Port-Channel name (up to 15 alphanumeric characters).

all - all Port-Channel interfaces.

no - This command removes that Port-Channel.

Default Setting

None

Command Mode

Global Config

Command Usage

Max number of port-channels could be created by user are 64. Number of members for each port-channel are 8.

9.4.4.5 port-channel adminmode all

This command sets every configured port-channel with the same administrative mode setting.

Syntax

```
port-channel adminmode all
no port-channel adminmode all
```

no - This command disables a port-channel (LAG). The option all sets every configured port-channel with the same administrative mode setting.

Default Setting

Enabled

Command Mode

Global Config

9.4.4.6 port-channel linktrap

This command enables link trap notifications for the port-channel (LAG). The interface is a logical slot and port for a configured port-channel. The option **all** sets every configured port-channel with the same administrative mode setting.

Syntax

```
port-channel linktrap {<slot/port> | all}
no port-channel linktrap {<slot/port> | all}
```

<slot/port> - Port-Channel Interface number.

all - all Port-Channel interfaces.

no - This command disables link trap notifications for the port-channel (LAG). The interface is a logical slot and port for a configured port-channel. The option **all** sets every configured port-channel with the same administrative mode setting.

Default Setting

Enabled

Command Mode

Global Config

9.4.4.7 port-channel name

This command defines a name for the port-channel (LAG). The interface is a logical slot and port for a configured port-channel, and name is an alphanumeric string up to 15 characters. This command is used to modify the name that was associated with the port-channel when it was created.

Syntax

```
port-channel name {<slot/port> | all} <name>
```

<slot/port> - Port-Channel Interface number.

all - all Port-Channel interfaces.

<name> - Configured Port-Channel name (up to 15 characters).

Default Setting

None

Command Mode

Global Config

9.4.4.8 port-channel load-balance

This command for CLI will configured the mode of load balance on the all Port Channels. The parameter "**src-mac | dst-mac | dst-src-mac | src-ip | dst-ip| dst-src-ip**" represent the mode used to be set for port-channel load balance.

Syntax

```
port-channel load-balance all { src-mac| dst-mac | dst-src-mac | src-ip | dst-ip| dst-src-ip }
no port-channel load-balance all
```

src-mac - Sets the mode on the source MAC address.

dst-mac - Sets the mode on the destination MAC address.

dst-src-mac - Sets the mode on the source and destination MAC addresses.

src-ip - Sets the mode on the source IP address.

dst-ip - Sets the mode on the destination IP address.

dst-src-ip - Sets the mode on the source and destination IP addresses.

no - Restore the mode to be default value.

Default Setting

dst-src-ip

Command Mode

Global Config

9.4.4.9 adminmode

This command enables a port-channel (LAG) members. The interface is a logical slot and port for a configured port-channel.

Syntax

```
adminmode
no adminmode
```

no - This command disables a configured port-channel (LAG).

Default Setting

Enabled

Command Mode

Interface Config

9.4.4.10 staticcapability

This command enables the support of static port-channels (static link aggregations - LAGs). By default, the static capability for all port-channels is disabled. The interface is a logical slot and port for a configured port-channel.

Syntax

```
staticcapability
no staticcapability
```

no - This command disables the support of static port-channels.

Default Setting

Disabled

Command Mode

Interface Config

9.4.4.11 lacp

This command enables Link Aggregation Control Protocol (LACP) on a specific uplink set.

Syntax

```
lacp <uplinkSetName>
no lacp <uplinkSetName>
```

<uplinkSetName> - The name of the uplink set which user want to set.

no - This command disables Link Aggregation Control Protocol (LACP) on a specific uplink set.

Default Setting

Disabled

Command Mode

Global Config

9.4.4.12 channel-group

This command adds one port to the port-channel (LAG). The first interface is a logical slot and port number of a configured port-channel.

Note: Before adding a port to a port-channel, set the physical mode of the port. See '**speed-duplex**' command.

Syntax

```
channel-group <slot/port>
```

<slot/port> - Port-Channel Interface number.

Default Setting

None

Command Mode

Interface Config

Command Usage

The maximum number of members for each Port-Channel is 8.

9.4.4.13 delete-channel-group

This command deletes the port from the port-channel (LAG). The interface is a logical slot and port number of a configured port-channel.

Syntax

```
delete-channel-group <slot/port>
```

<slot/port> - Port-Channel Interface number.

Default Setting

None

Command Mode

Interface Config

This command deletes all configured ports from the port-channel (LAG). The interface is a logical slot and port number of a configured port-channel.

Syntax

```
delete-channel-group <slot/port> all
```

<slot/port> - Port-Channel Interface number.

all - All members for specific Port-Channel.

Default Setting

None

Command Mode

Global Config

9.4.5 Storm Control

9.4.5.1 show storm-control

This command is used to display broadcast storm control information.

Syntax

show storm-control broadcast

Default Setting

None

Command Mode

Privileged Exec

Display Message

Intf: Displays interface number.

Mode: Displays status of storm control broadcast.

Rate: Displays rate for storm control broadcast.

Unit: Displays unit of rate for storm control broadcast.

Action: Display the configured action for interfaces when broadcast storm occurs.

This command is used to display multicast storm control information.

Syntax

show storm-control multicast

Default Setting

None

Command Mode

Privileged Exec

Display Message

Intf: Displays interface number.

Mode: Displays status of storm control multicast.

Rate: Displays rate for storm control multicast.

Unit: Displays unit of rate for storm control multicast.

Action: Display the configured action for interfaces when multicast storm occurs.

This command is used to display unicast storm control information

Syntax

show storm-control unicast

Default Setting

None

Command Mode

Privileged Exec

Display Message

Intf: Displays interface number.

Mode: Displays status of storm control unicast.

Rate: Displays rate for storm control unicast.

Unit: Displays unit of rate for storm control unicast.

Action: Display the configured action for interfaces when unicast storm occurs.

9.4.5.2 storm-control broadcast

This command enables broadcast storm recovery mode on the selected interface. If the mode is enabled, broadcast storm recovery with high threshold is implemented. The threshold implementation follows bit per second and packet per second pattern. If the broadcast traffic on any Ethernet port exceeds the high threshold rate, the switch discards the broadcasts traffic until the broadcast traffic returns to the threshold rate or less.

Syntax

```
storm-control broadcast
no storm-control broadcast
```

no - This command disables broadcast storm recovery mode on the seleted interfaces.

Default Setting

Enabled

Command Mode

Interface Config

This command enables broadcast storm recovery mode on all interfaces.

Syntax

```
storm-control broadcast
no storm-control broadcast
```

no - This command disables broadcast storm recovery mode on all interfaces.

Default Setting

None

Command Mode

Global Config

9.4.5.3 storm-control multicast

This command enables multicast storm recovery mode on the selected interface.

Syntax

```
storm-control multicast
no storm-control multicast
```

no - This command disables multicast storm recovery mode on the selected interface.

Default Setting

Disabled

Command Mode

Interface Config

This command enables multicast storm recovery mode on all interfaces.

Syntax

```
storm-control multicast
no storm-control multicast
```

no - This command disables multicast storm recovery mode on all interfaces.

Default Setting

None

Command Mode

Global Config

9.4.5.4 storm-control unicast

This command enables unicast storm recovery mode on the selected interface.

Syntax

```
storm-control unicast
no storm-control unicast
```

no - This command disables unicast storm recovery mode on the selected interface.

Default Setting

Enabled

Command Mode

Interface Config

This command enables unicast storm recovery mode on all interfaces.

Syntax

```
storm-control unicast
no storm-control unicast
```

no - This command disables unicast storm recovery mode on all interfaces.

Default Setting

None

Command Mode

Global Config

9.4.5.5 switchport broadcast {bps|pps} <1-4294967295> [k|m|g]

This command will protect your network from broadcast storms by setting a threshold rate for broadcast traffic on each port.

Syntax

```
switchport broadcast {bps|pps} <1-4294967295> [k|m|g]
no switchport broadcast
```

bps: bit per second, specify the rising threshold bit rate for broadcast storm.

pps: packet per second, specify the rising threshold packet rate for broadcast storm.

<1-4294967295>: threshold rate range is from 1 to 4294967295.

[k|m|g]: rate unit, **k** means threshold rate would be multiply 1000, **m** means threshold rate would be multiply 1000000, **g** means threshold rate would be multiply 1000000000.

no - This command set the threshold rate to default.

Default Setting

512 pps

Command Mode

Interface Config

This command will protect your network from broadcast storms by setting a threshold rate for broadcast traffic on all ports.

Syntax

```
switchport broadcast all {bps|pps} <1-4294967295> [k|m|g]
no switchport broadcast all
```

bps: bit per second, specify the rising threshold bit rate for broadcast storm.

pps: packet per second, specify the rising threshold packet rate for broadcast storm.

<1-4294967295>: threshold rate range is from 1 to 4294967295.

[k|m|g]: rate unit, **k** means threshold rate would be multiply 1000, **m** means threshold rate would be multiply 1000000, **g** means threshold rate would be multiply 1000000000.

all - This command represents all interfaces.

no - This command set the threshold rate to default.

Default Setting

512 pps

Command Mode

Global Config

9.4.5.6 switchport multicast {bps|pps} <1-4294967295> [k|m|g]

This command will protect your network from multicast storms by setting a threshold rate for multicast traffic on each port.

Syntax

switchport multicast {bps|pps} <1-4294967295> [k|m|g]
no switchport multicast

bps: bit per second, specify the rising threshold bit rate for multicast storm.

pps: packet per second, specify the rising threshold packet rate for multicast storm.

<1-4294967295>: threshold rate range is from 1 to 4294967295.

[k|m|g]: rate unit, **k** means threshold rate would be multiply 1000, **m** means threshold rate would be multiply 1000000, **g** means threshold rate would be multiply 1000000000.

no - This command set the threshold rate to default.

Default Setting

512 pps

Command Mode

Interface Config

This command will protect your network from multicast storms by setting a threshold rate for multicast traffic on all ports.

Syntax

switchport multicast all {bps|pps} <1-4294967295> [k|m|g]
no switchport multicast all

bps: bit per second, specify the rising threshold bit rate for multicast storm.

pps: packet per second, specify the rising threshold packet rate for multicast storm.

<1-4294967295>: threshold rate range is from 1 to 4294967295.

[k|m|g]: rate unit, **k** means threshold rate would be multiply 1000, **m** means threshold rate would be multiply 1000000, **g** means threshold rate would be multiply 1000000000.

all - This command represents all interfaces.

no - This command set the threshold rate to default.

Default Setting

512 pps

Command Mode

Global Config

9.4.5.7 switchport unicast {bps|pps} <1-4294967295> [k|m|g]

This command will protect your network from unicast storms by setting a threshold rate for unicast traffic on each port.

Syntax

```
switchport unicast {bps|pps} <1-4294967295> [k|m|g]
no switchport unicast
```

bps: bit per second, specify the rising threshold bit rate for unicast storm.

pps: packet per second, specify the rising threshold packet rate for unicast storm.

<1-4294967295>: threshold rate range is from 1 to 4294967295.

[k|m|g]: rate unit, **k** means threshold rate would be multiply 1000, **m** means threshold rate would be multiply 1000000, **g** means threshold rate would be multiply 1000000000.

no - This command set the threshold rate to default.

Default Setting

512 pps

Command Mode

Interface Config

This command will protect your network from unicast storms by setting a threshold rate for unicast traffic on all ports.

Syntax

```
switchport unicast all {bps|pps} <1-4294967295> [k|m|g]
no switchport unicast all
```

bps: bit per second, specify the rising threshold bit rate for unicast storm.

pps: packet per second, specify the rising threshold packet rate for unicast storm.

<1-4294967295>: threshold rate range is from 1 to 4294967295.

[k|m|g]: rate unit, **k** means threshold rate would be multiply 1000, **m** means threshold rate would be multiply 1000000, **g** means threshold rate would be multiply 1000000000.

all - This command represents all interfaces.

no - This command set the threshold rate to default.

Default Setting

512 pps

Command Mode

Global Config

9.4.5.8 storm-control action

Specify the action to be taken when a storm control detected on the selected port.

Syntax

```
storm-control action {shutdown|trap}
no storm-control action {shutdown|trap}
```

shutdown: disable admin mode of the seleted port when strom control is detected.

trap: send a snmp trap when storm control is detected.

no - This command disable action on selected port.

Default Setting

Disable

Command Mode

Interface Config

9.4.6 Error Disable Recovery

9.4.6.1 show errdisable recovery

This command displays the reason of error disable, timer status and error disable information of port status.

Syntax

show errdisable recovery

Default Setting

None

Command Mode

Privileged Exec

Display Message

ErrDisable Reason: The cause reason for error disable occurring.

Timer Status: Admin mode of error disable reason.

Timer Interval: The error disable recovery interval.

Interface: Port number of error disable occurring port.

ErrDisable Reason: The cause reason for error disable occurring.

Time Left (Sec): The lefting recovery time of error disable port.

9.4.6.2 errdisable recovery cause

The command set admin mode for error disable cause.

Syntax

errdisable recovery cause storm-control
no errdisable recovery cause storm-control

no - This command set the admin mode of error disable cause by storm control to default.

Default Setting

Disable

Command Mode

Global Config

Syntax

```
errdisable recovery cause udld
no errdisable recovery cause udld
```

no - This command set the admin mode of error disable cause by udld to default.

Default Setting

Disable

Command Mode

Global Config

9.4.6.3 errdisable recovery interval

The command set error disable recovery timer interval.

Syntax

```
errdisable recovery interval <30-86400>
no errdisable recovery interval
```

no - This command set the error disable recovey interval to default.

Default Setting

300 seconds

Command Mode

Global Config

9.4.7 L2 Priority

9.4.7.1 show queue cos-map

This command displays the class of service priority map on a specific interface.

Syntax

show queue cos-map [<slot/port>]

<slot/port> - Interface number.

Default Setting

None

Command Mode

Privileged Exec

Display Message

User Priority: Displays the 802.1p priority to be mapped.

Traffic Class: Displays internal traffic class to map the corresponding 802.1p priority.

9.4.7.2 queue cos-map

This command is used to assign class of service (CoS) value to the CoS priority queue.

Syntax

```
queue cos-map <priority> <queue-id>
no queue cos-map
```

<queue-id> - The queue id of the CoS priority queue (Range: 0 - 7).

<priority> - The CoS value that is mapped to the queue id (Range: 0 - 7).

no - Sets the CoS map to the default values.

Default Setting

priority	queue
0	1
1	0
2	0
3	1
4	2
5	2
6	3
7	3

Command Mode

Interface Config

9.4.8 Port Mirror

9.4.8.1 show port-monitor session

This command displays the Port monitoring information for the specified session.

Syntax

show port-monitor session <SessionNum>

Default Setting

None

Command Mode

Privileged Exec

Display Message

Session ID: indicates the session ID.

Admin Mode: indicates whether the Port Monitoring feature is enabled or disabled. The possible values are enabled and disabled.

Dest. Port: is the slot/port that is configured as the destination port. If this value has not been configured, 'Not Configured' will be displayed.

Sour. Port: is the slot/port that is configured as the source port. If this value has not been configured, 'Not Configured' will be displayed.

Type: Direction in which source port configured for port mirroring. Types are tx for transmitted packets and rx for receiving packets.

9.4.8.2 port-monitor session

This command configures a probe port and a monitored port for monitor session (port monitoring). Use the source interface <slot/port> parameter to specify the interface to monitor. Use rx to monitor only ingress packets, or use tx to monitor only egress packets. If you do not specify an {rx | tx} option, the destination port monitors both ingress and egress packets. Use the destination interface <slot/port> to specify the interface to receive the monitored traffic.

Syntax

port-monitor session <session-id> {source interface <slot/port> [{rx | tx}] | destination interface <slot/port> }
no port-monitor session <session-id> { source interface <slot/port> | destination interface <slot/port>}

<slot/port> - Interface number.

tx/rx – Use to monitor ingress packets or egress packets.

no - This command removes the probe port or the mirrored port from a monitor session (port monitoring).

Default Setting

None

Command Mode

Global Config

This command removes all configured destination ports and source ports.

Syntax

no port-monitor

Default Setting

None

Command Mode

Global Config

9.4.8.3 port-monitor session mode

This command configures the administration mode of port-monitoring function for a monitor session.

Syntax

```
port-monitor session <session-id> mode
no port-monitor session <session-id> mode
```

<session-id> - Session ID.

no - This command disables port-monitoring function for a monitor session.

9.5 Management Commands

9.5.1 Network Commands

9.5.1.1 show ip interface

This command displays configuration settings associated with the IBP 's network interface. The network interface is the logical interface used for in-band connectivity with the IBP via any of the IBP 's front panel ports. The configuration parameters associated with the IBP 's network interface do not affect the configuration of the front panel ports through which traffic is switched or routed.

Syntax

show ip interface

Default Setting

None

Command Mode

User Exec, Privileged Exec

Display Message

IP address: The IP address of the interface. The factory default value is 0.0.0.0

netmask: The IP subnet mask for this interface. The factory default value is 0.0.0.0

VLAN: Specifies the management VLAN ID.

9.5.1.2 show ip redirects

This command displays IP default gateway for this IBP.

Syntax

show ip redirects

Default Setting

None

Command Mode

User Exec, Privileged Exec

Display Message

IP default gateway: The default gateway for this IP interface. The factory default value is 0.0.0.0.

9.5.1.3 show ip filter

This command displays management IP filter status and all designated management stations.

Syntax

show ip filter

Default Setting

None

Command Mode

Privileged Exec

Display Message

Name: The name of IPv4/IPv6 stations.

IP Address/Prefix: The IPv4 address and IPv6 Prefix of stations that are allowed to make configuration changes to the Switch.

IP Mask/Prefix Length: The IPv4 mask address and IPv6 Prefix length of stations that are allowed to make configuration changes to the Switch.

9.5.1.4 mtu

This command sets the maximum transmission unit (MTU) size (in bytes) for physical and port-channel (LAG) interfaces. For the standard implementation, the range of <1518-9216> is a valid integer between 1518-9216.

Syntax

```
mtu <1518-9216>
no mtu
```

<1518-9216> - Max frame size (Range: 1518 - 9216).

no - This command sets the default maximum transmission unit (MTU) size (in bytes) for the interface.

Default Setting

1518

Command Mode

Interface Config

9.5.1.5 ip address

This command sets the IP address, and subnet mask. The IP address and the gateway must be on the same subnet.

Syntax

```
ip address <ipaddr> <netmask> <vlanid>
no ip address
```

<ipaddr> - IP address

<netmask> - Subnet Mask

<vlanid> - VLAN ID (Range: 1 - 4094).

no - Restore the default IP address and Subnet Mask

Default Setting

IP address : 0.0.0.0

Subnet Mask : 0.0.0.0

Command Mode

Global Config

Command Usage

Once the IP address is set, the VLAN ID’s value will be assigned to management VLAN.

9.5.1.6 ip default-gateway

This command sets the IP address of the default gateway.

Syntax

```
ip default-gateway <gateway>
no ip default-gateway
```

< gateway > - IP address of the default gateway

no - Restore the default IP address of the default gateway

i The gateway of in-band and out-of-band (oob) management interface can't be set at the same time. If the gateway of oob has been set, you have to remove it before you configure the gateway of in-band management interface.

Default Setting

IP address : 0.0.0.0

Command Mode

Global Config

9.5.1.7 ip address protocol

This command specifies the network configuration protocol to be used. If you modify this value, the change is effective immediately.

Syntax

```
ip address protocol {bootp | dhcp | none}
```

<bootp> - Obtains IP address from BOOTP.

<dhcp> - Obtains IP address from DHCP.

<none> - Obtains IP address by setting configuration.

i Both of in-band and out-of-band management interfaces could be configured to use DHCP to get the IP address from DHCP server at a time, but not simultaneously.

Default Setting

None

Command Mode

Global Config

9.5.1.8 enable ipv6 stack

This command is used to enable the IPv6 stack for in-band mgmt interface.

Syntax

```
ipv6 enable
no ipv6 enable
```

no – Disable IPv6 stack for in-band mgmt interface.

Default Setting

Disabled

Command Mode

Global Config

9.5.1.9 enable ip filter

This command is used to enable the IP filter function.

Syntax

```
ip filter
no ip filter
```

no – Disable IP filter.

Default Setting

Disabled

Command Mode

Global Config

9.5.1.10 ip filter

This command is used to create an IPv4/IPv6 address to be a filter.

Syntax

```
ip filter <name> ipv4 <ipAddr> [<mask>]
no ip filter <name>
```

<name> - The name of the ip filter.

<ipAddr> - Configure a IPv4 address to be filtered.

<mask> - Configure a IPv4 netmask to be filtered.

no - Remove a filter by filter name.

Default Setting

None

Command Mode

Global Config

Syntax

```
ip filter < name> ipv6 <prefix/length>
no ip filter < name>
```

<name> - The name of the ip filter.

<prefix/length> - Configure a IPv6 prefix and prefix length to be a filter.

no - Remove ip filter by filter name

Default Setting

None

Command Mode

Global Config

9.5.1.11 show oob

This command displays configuration settings associated with the out-of-band (OOB) interface.

Syntax
show oob

Default Setting

None

Command Mode

Privileged Exec

Display Message

IP Address: The IP address of the interface. The factory default value is 0.0.0.0

Subnet Mask: The IP subnet mask for this interface. The factory default value is 0.0.0.0

Default Gateway: The IP address of the default gateway.

IPv6 Address: The IPv6 address of the OOB interface.

OOB interface Configured Protocol: The network configuration protocol to be used. The factory default is DHCP.

Burned In MAC Address: The default MAC address of the OOB interface.

Operational MAC Address: The operational MAC address of the OOB interface. (Only used in stackable connection blade)

9.5.1.12 oob ip

This command sets the IP address, and subnet mask of oob interface. The IP address and the gateway must be on the same subnet.

Syntax

```
oob ip <ipaddr> <netmask>
```

<ipaddr> - IP address

<netmask> - Subnet Mask

Default Setting

IP address : 0.0.0.0

Subnet Mask : 0.0.0.0

Command Mode

Global Config

9.5.1.13 oob gateway

This command sets the IP address of the default gateway for out-of-band interface.

Syntax

```
oob gateway <gateway>
no oob gateway
```

< gateway > - IP address of the default gateway

no - Restore the default IP address of the default gateway

i The gateway of in-band and out-of-band (oob) management interface can't be set at the same time. If the gateway of oob has been set, you have to remove it before you configure the gateway of in-band management interface.

Default Setting

Gateway Address : 0.0.0.0

Command Mode

Global Config

9.5.1.14 oob protocol

This command specifies the oob configuration protocol to be used. If you modify this value, the change is effective immediately.

Syntax

```
oob protocol {bootp | dhcp | dhcp6 | none}
```

<bootp> - Obtains IP address from BOOTP.

<dhcp> - Obtains IP address from DHCP.

<dhcp6> - Obtains IPv6 address from DHCPv6.

<none> - Obtains IP address by setting configuration.

Both of in-band and out-of-band management interfaces could be configured to use DHCP to get the IP address from DHCP server at a time, but not simultaneously.

Default Setting

DHCP

Command Mode

Global Config

9.5.1.15 enable ipv6 stack

This command is used to enable the IPv6 stack for out-of-band mgmt interface.

Syntax

```
oob ipv6 enable
no oob ipv6 enable
```

no – Disable IPv6 stack.

Default Setting

Enabled

Command Mode

Global Config

9.5.2 Serial Interface Commands

9.5.2.1 show line console

This command displays serial communication settings for the IBP.

Syntax
show line console

Default Setting

None

Command Mode

User Exec, Privileged Exec

Display Message

Serial Port Login Timeout (minutes): Specifies the time, in minutes, of inactivity on a Serial port connection, after which the IBP will close the connection. Any numeric value between 0 and 160 is allowed, the factory default is 5. A value of 0 disables the timeout.

Baud Rate: The default baud rate at which the serial port will try to connect. The available values are 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200 bauds.

Character Size: The number of bits in a character. The number of bits is always 8.

Flow Control: Whether Hardware Flow-Control is enabled or disabled. Hardware Flow Control is always disabled.

Stop Bits: The number of Stop bits per character. The number of Stop bits is always 1.

Parity: The Parity Method used on the Serial Port. The Parity Method is always None.

Password Threshold: When the logon attempt threshold is reached on the console port, the system interface becomes silent for a specified amount of time before allowing the next logon attempt. (Use the silent time command to set this interval.) When this threshold is reached for Telnet, the Telnet logon interface closes.

Silent Time (sec): Use this command to set the amount of time the management console is inaccessible after the number of unsuccessful logon attempts exceeds the threshold set by the password threshold command.

9.5.2.2 line console

This command is used to enter Line configuration mode

Syntax

line console

Default Setting

None

Command Mode

Global Config

9.5.2.3 baudrate

This command specifies the communication rate of the terminal interface. The supported rates are 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200.

Syntax

baudrate {1200 | 2400 | 4800 | 9600 | 19200 | 38400 | 57600 | 115200}
no baudrate

no - This command sets the communication rate of the terminal interface to **9600**.

Default Setting

9600

Command Mode

Line Config

9.5.2.4 exec-timeout

This command specifies the maximum connect time (in minutes) without console activity. A value of 0 indicates that a console can be connected indefinitely. The time range is 0 to 160.

Syntax

```
exec-timeout <0-160>
```

<0-160> - max connect time (Range: 0 -160).

no - This command sets the maximum connect time (in minutes) without console activity to 5.

Default Setting

5

Command Mode

Line Config

9.5.2.5 password-threshold

This command is used to set the password instruction threshold limiting the number of failed login attempts.

Syntax

```
password-threshold <0-120>
no password-threshold
```

<threshold> - max threshold (Range: 0 - 120).

no - This command sets the maximum value to the default.

Default Setting

3

Command Mode

Line Config

9.5.2.6 silent-time

This command uses to set the amount of time the management console is inaccessible after the number of unsuccessful logon tries exceeds the threshold value.

Syntax

silent-time <0-65535>

<0-65535> - silent time (Range: 0 - 65535) in seconds.

no - This command sets the maximum value to the default.

Default Setting

0

Command Mode

Line Config

9.5.2.7 login local

This command is used to enable password checking at login.

Syntax

login local

Default Setting

Enabled

Command Mode

Line Config

9.5.2.8 terminal-length

This command is used to sets the terminal-length of the CLI console terminal.

Syntax

terminal-length <10-100>
no terminal-length

<length> - max threshold (Range: 10 - 100).

no - This command sets the length to the default.

Default Setting

24

Command Mode

Line Config

9.5.2.9 show pager

This command displays pager settings.

Syntax

show pager

Default Setting

None

Command Mode

Privileged Exec

9.5.2.10 pager

This command is used to enable/disable pager mode. If the pager mode is enabled, the displayed data on terminal will be displayed one page at a time.

Syntax

pager
no pager

no - This command sets pager mode to disable.

Default Setting

Enable

Command Mode

Privileged Exec

9.5.2.11 show displaymode

This command displays extended display settings.

Syntax

show displaymode

Default Setting

None

Command Mode

Privileged Exec

9.5.2.12 displaymode

This command is used to enable/disable extended display mode. In the extended display mode, the displayed information will have more than 80 characters per line.

Syntax

displaymode
no displaymode

no - This command sets extended display mode to disable.

i To get the better display style on extended display mode, you have to use the terminal which is supported to display more than 80 characters per line.

Default Setting

Enable

Command Mode

Privileged Exec

9.5.3 Telnet Session Commands

9.5.3.1 telnet

This command establishes a new outbound telnet connection to a remote host.

Syntax

telnet <host> [port] [debug] [line] [echo]

<host> - A hostname or a valid IP address.

[port] - A valid decimal integer in the range of 0 to 65535, where the default value is 23.

[debug] - Display current enabled telnet options.

[line] - Set the outbound telnet operational mode as 'linemode', where by default, the operational mode is 'character mode'.

[echo] - Enable local echo.

Default Setting

None

Command Mode

User Exec, Privileged Exec

9.5.3.2 show line vty

This command displays telnet settings.

Syntax

show line vty

Default Setting

None

Command Mode

Privileged Exec

Display Message

Remote Connection Login Timeout (minutes): This object indicates the number of minutes a remote connection session is allowed to remain inactive before being logged off. A zero means there will be no timeout. May be specified as a number from 0 to 160. The factory default is 5.

Maximum Number of Remote Connection Sessions: This object indicates the number of simultaneous remote connection sessions allowed. The factory default is 5.

Allow New Telnet Sessions: Indicates that new telnet sessions will not be allowed when set to no. The factory default value is yes.

Password Threshold: When the logon attempt threshold is reached on the console port, the system interface becomes silent for a specified amount of time before allowing the next logon attempt. (Use the silent time command to set this interval.) When this threshold is reached for Telnet, the Telnet logon interface closes.

9.5.3.3 line vty

This command is used to enter vty (Telnet) configuration mode.

Syntax

line vty

Default Setting

None

Command Mode

Global Config

9.5.3.4 server enable

This command is used to enable or disable telnet server.

Syntax

```
server enable
no server enable
```

no - This command sets to disable.

Default Setting

Disabled

Command Mode

Line Vty

9.5.3.5 exec-timeout

This command sets the remote connection session timeout value, in minutes. A session is active as long as the session has been idle for the value set. A value of 0 indicates that a session remains active indefinitely. The time is a decimal value from 0 to 160.

Syntax

```
exec-timeout <1-160>
no exec-timeout
```

<sec> - max connect time (Range: 1 -160).

no - This command sets the remote connection session timeout value, in minutes, to the default.

Changing the timeout value for active sessions does not become effective until the session is reaccessed. Any keystroke will also activate the new timeout duration.

Default Setting

5

Command Mode

Line Vty

9.5.3.6 password-threshold

This command is used to set the password instruction threshold limited for the number of failed login attempts.

Syntax

```
password-threshold <0-120>
no password-threshold
```

<threshold> - max threshold (Range: 0 - 120).

no - This command sets the maximum value to the default.

Default Setting

3

Command Mode

Line Vty

9.5.3.7 maxsessions

This command specifies the maximum number of remote connection sessions that can be established. A value of 0 indicates that no remote connection can be established. The range is 0 to 5.

Syntax

```
maxsessions <0-5>
no maxsessions
```

<0-5> - max sessions (Range: 0 - 5).

no - This command sets the maximum value to be 5.

Default Setting

5

Command Mode

Line Vty

9.5.3.8 sessions

This command regulates new telnet sessions. If sessions are enabled, new telnet sessions can be established until there are no more sessions available. If sessions are disabled, no new telnet sessions are established. An established session remains active until the session is ended or an abnormal network error ends it.

Syntax

```
sessions
no sessions
```

no - This command disables telnet sessions. If sessions are disabled, no new telnet sessions are established.

Default Setting

Enabled

Command Mode

Line Vty

9.5.3.9 terminal-length

This command is used to sets the terminal-length of the cli vty terminal.

Syntax

```
terminal-length <10-100>
no terminal-length
```

<length> - max threshold (Range: 10 - 100).

no - This command sets the length to the default.

Default Setting

24

Command Mode

Line Vty

9.5.3.10 telnet sessions

This command regulates new outbound telnet connections. If enabled, new outbound telnet sessions can be established until it reaches the maximum number of simultaneous outbound telnet sessions allowed. If disabled, no new outbound telnet session can be established. An established session remains active until the session is ended or an abnormal network error ends it.

Syntax

```
telnet sessions
no telnet sessions
```

no - This command disables new outbound telnet connections. If disabled, no new outbound telnet connection can be established.

Default Setting

Enabled

Command Mode

Global Config

9.5.3.11 telnet maxsessions

This command specifies the maximum number of simultaneous outbound telnet sessions. A value of 0 indicates that no outbound telnet session can be established.

Syntax

```
telnet maxsessions <0-5>
no maxsessions
```

<0-5> - max sessions (Range: 0 - 5).

no - This command sets the maximum value to be 5.

Default Setting

5

Command Mode

Global Config

9.5.3.12 telnet exec-timeout

This command sets the outbound telnet session timeout value in minute.

Syntax

```
telnet exec-timeout <1-160>
no telnet exec-timeout
```

<1-160> - max connect time (Range: 1 -160).

no - This command sets the remote connection session timeout value, in minutes, to the default.

i Changing the timeout value for active sessions does not become effective until the session is reaccessed. Any keystroke will also activate the new timeout duration.

Default Setting

5

Command Mode

Global Config

9.5.3.13 show telnet

This command displays the current outbound telnet settings.

Syntax

```
show telnet
```

Default Setting

None

Command Mode

User Exec, Privileged Exec

Display Message

Outbound Telnet Login Timeout (in minutes): Indicates the number of minutes an outbound telnet session is allowed to remain inactive before being logged off. A value of 0, which is the default, results in no timeout.

Maximum Number of Outbound Telnet Sessions: Indicates the number of simultaneous outbound telnet connections allowed.

Allow New Outbound Telnet Sessions: Indicates whether outbound telnet sessions will be allowed.

9.5.4 SSH Client Session Commands

9.5.4.1 ssh

This command establishes a new outbound ssh connection to a remote host.

Syntax

```
ssh <ip-address|hostname> <username> { [port <1-65535>] [protocol <protocollevel>] | [protocol <protocollevel>] [port <1-65535>]}
```

<ip-address|hostname> - A hostname or a valid IP address.

<username> - user account.

[port] - A valid decimal integer in the range of 1 to 65535, where the default value is 22.

[protocol] - SSH Protocol Level (Version) 1 or 2.

Default Setting

None

Command Mode

User Exec, Privileged Exec

9.5.4.2 sshc sessions

This command regulates new outbound ssh connections. If enabled, new outbound ssh sessions can be established until it reaches the maximum number of simultaneous outbound ssh sessions allowed. If disabled, no new outbound ssh session can be established. An established session remains active until the session is ended or an abnormal network error ends it.

Syntax

```
sshc sessions
no sshc session
```

no - This command disables new outbound ssh connections. If disabled, no new outbound ssh connection can be established.

Default Setting

Enabled

Command Mode

Global Config

9.5.4.3 sshc maxsessions

This command specifies the maximum number of simultaneous outbound ssh sessions. A value of 0 indicates that no outbound ssh session can be established.

Syntax

```
sshc maxsession <0-5>
no sshc maxsession
```

<0-5> - max sessions (Range: 0 - 5).

no - This command sets the maximum value to be 5.

Default Setting

5

Command Mode

Global Config

9.5.4.4 sshc exec-timeout

This command sets the outbound ssh session timeout value in minute.

Syntax

```
sshc exec-timeout <1-160>
no sshc exec-timeout
```

<1-160> - max connect time (Range: 1 -160).

no - This command sets the remote connection session timeout value, in minutes, to the default.

Note: Changing the timeout value for active sessions does not become effective until the session is reaccessed. Any keystroke will also activate the new timeout duration.

Default Setting

5

Command Mode

Global Config

9.5.4.5 show sshc

This command displays the current outbound sshc settings.

Syntax
show sshc

Default Setting

None

Command Mode

User Exec, Privileged Exec

Display Message

Outbound SSH Login Timeout (in minutes) Indicates the number of minutes an outbound ssh session is allowed to remain inactive before being logged off. A value of 0, which is the default, results in no timeout.

Maximum Number of Outbound SSH Sessions Indicates the number of simultaneous outbound ssh connections allowed.

Allow New Outbound SSH Sessions Indicates whether outbound ssh sessions will be allowed.

9.5.5 SNMP Server Commands

9.5.5.1 show snmp

This command displays SNMP community information.

Six communities are supported. You can add, change, or delete communities. The IBP does not have to be reset for changes to take effect.

The SNMP agent of the IBP complies with SNMP versions 1, 2c, and 3 (for more about the SNMP specification, see the SNMP RFCs). The SNMP agent sends traps through TCP/IP to an external SNMP manager based on the SNMP configuration (the trap receiver and other SNMP community parameters).

Syntax
show snmp

Default Setting

None

Command Mode

Privileged Exec

Display Message

SNMP Community Name: The community string to which this entry grants access. A valid entry is a case-sensitive alphanumeric string of up to 64 characters. Each row of this table must contain a unique community name.

Client IP Address: An IP address (or portion thereof) from which this device will accept SNMP packets with the associated community. The requesting entity's IP address is ANDed with the Subnet Mask before being compared to the IP Address. Note: that if the Subnet Mask is set to 0.0.0.0, an IP Address of 0.0.0.0 matches all IP addresses. The default value is 0.0.0.0

Client IP Mask: A mask to be ANDed with the requesting entity's IP address before comparison with IP Address. If the result matches with the IP Address then the address is an authenticated IP address. For example, if the IP Address = 9.47.128.0 and the corresponding Subnet Mask = 255.255.255.0, a range of incoming IP addresses would match. That is, the incoming IP Address could equal 9.47.128.0 - 9.47.128.255. The default value is 0.0.0.0.

Access Mode: The access level for this community string.

Status: The status of this community access entry.

9.5.5.2 show snmp user

This command displays SNMP user information.

Syntax

show snmp user

Default Setting

None

Command Mode

Privileged Exec

Display Message

User Name: The user to which this entry grants access. A valid entry is a case-sensitive alphanumeric string of up to 8 characters.

Authentication: Specify the SNMPv3 Authenticatiion Protocol setting for the selected user account.

Encryption: Specify the SNMPv3 Encryption Protocol setting for the selected user account.

9.5.5.3 show snmp engineID

This command displays SNMP engineID information.

Syntax

show snmp engineID

Default Setting

None

Command Mode

Privileged Exec

Display Message

Remote EngineID: Engine ID are up to 24 hexadecimal characters in length.

IP Address: IP address of SNMP host which will receive SNMP trap/inform from this switch.

9.5.5.4 show trapflags

This command displays trap conditions. Configure which traps the IBP should generate by enabling or disabling the trap condition. If a trap condition is enabled and the condition is detected, the IBP 's SNMP agent sends the trap to all enabled trap receivers. The IBP does not have to be reset to implement the changes. Cold and warm start traps are always generated and cannot be disabled.

Syntax

```
show trapflags
```

Default Setting

None

Command Mode

Privileged Exec

Display Message

Authentication Flag: May be enabled or disabled. The factory default is enabled. Indicates whether authentication failure traps will be sent.

Link Up/Down Flag: May be enabled or disabled. The factory default is enabled. Indicates whether link status traps will be sent.

Multiple Users Flag: May be enabled or disabled. The factory default is enabled. Indicates whether a trap will be sent when the same user ID is logged into the IBP more than once at the same time (either via telnet or serial port).

ACL Traps: May be enabled or disabled. The factory default is disabled. Indicates whether ACL traps will be sent.

9.5.5.5 snmp-server sysname

This command sets the name of the IBP. The range for name is from 1 to 31 alphanumeric characters.

Syntax

```
snmp-server sysname <name>
```

<name> - Range is from 1 to 31 alphanumeric characters.

Default Setting

None

Command Mode

Global Config

9.5.5.6 snmp-server location

This command sets the physical location of the IBP. The range for name is from 1 to 31 alphanumeric characters.

Syntax

```
snmp-server location <loc>
```

<loc> - range is from 1 to 31 alphanumeric characters.

Default Setting

None

Command Mode

Global Config

9.5.5.7 snmp-server contact

This command sets the organization responsible for the network. The range for contact is from 1 to 31 alphanumeric characters.

Syntax

```
snmp-server contact <con>
```

<con> - Range is from 1 to 31 alphanumeric characters.

Default Setting

None

Command Mode

Global Config

9.5.5.8 snmp-server community

This command adds (and names) a new SNMP community. A community name is a name associated with the IBP and with a set of SNMP managers that manage it with a specified privilege level. The length of the name can be up to 64 case-sensitive characters.

Note: Community names in the SNMP community table must be unique. If you make multiple entries using the same community name, the first entry is kept and processed and all duplicate entries are ignored.

Syntax

```
snmp-server community <name>
no snmp-server community <name>
```

<name> - community name (up to 64 case-sensitive characters).

no - This command removes this community name from the table. The name is the community name to be deleted.

Default Setting

Two default community names: **public** and **private**. You can replace these default community names with unique identifiers for each community. The default values for the remaining four community names are blank.

Command Mode

Global Config

This command activates an SNMP community. If a community is enabled, an SNMP manager associated with this community manages the IBP according to its access right. If the community is disabled, no SNMP requests using this community are accepted. In this case the SNMP manager associated with this community cannot manage the IBP until the Status is changed back to Enable.

Syntax

```
snmp-server community mode <name>
no snmp-server community mode <name>
```

<name> - community name.

no - This command deactivates an SNMP community. If the community is disabled, no SNMP requests using this community are accepted. In this case the SNMP manager associated with this community cannot manage the IBP until the Status is changed back to Enable.

Default Setting

The default public and private communities are enabled by default. The four undefined communities are disabled by default.

Command Mode

Global Config

This command restricts access to IBP information. The access mode is read-only (also called public) or read/write (also called private).

Syntax

```
snmp-server community {ro | rw} <name>
```

<name> - community name.

<ro> - access mode is read-only.

<rw> - access mode is read/write.

Default Setting

None

Command Mode

Global Config

9.5.5.9 snmp-server host

This command sets a client IP or IPv6 address for an SNMP community. The address is the associated community SNMP packet sending address and is used along with the client IP mask value to denote a range of IP addresses from which SNMP clients may use that community to access the device. A value of 0.0.0.0 allows access from any IP address. Otherwise, this value is ANDed with the mask to determine the range of allowed client IP addresses. The name is the applicable community name.

Syntax

snmp-server host <ipaddr | ipv6Addr> <name>
No snmp-server host <name>

<name> - community name.

<ipaddr | ipv6Addr> - a client IPv4 or IPv6 address.

no - This command sets a client IP address for an SNMP community to 0.0.0.0. The name is the applicable community name.

Default Setting

0.0.0.0

Command Mode

Global Config

9.5.5.10 snmp-server host ipmask

This command sets a client IP mask for an SNMP community.

Syntax

snmp-server host ipmask <ipmask > <name>
No snmp-server host ipmask <name>

<name> - community name.

<ipmask> - a client IP mask.

no - This command sets a client IP mask for an SNMP community to 0.0.0.0. The name is the applicable community name.

Default Setting

0.0.0.0

Command Mode

Global Config

9.5.5.11 snmp-server enable traps

This command enables the ACL trap.

Syntax

```
snmp-server enable traps acl-trapflags
no snmp-server enable traps acl-trapflags
```

no - This command disables the ACL trap.

Default Setting

Disabled

Command Mode

Global Config

This command enables the authentication trap.

Syntax

```
snmp-server enable traps authentication
no snmp-server enable traps authentication
```

no - This command disables the Authentication trap.

Default Setting

Enabled

Command Mode

Global Config

This command enables Link Up/Down traps for the entire IBP. When enabled, link traps are sent only if the Link Trap flag setting associated with the port is enabled (see '**snmp trap link-status**' command).

Syntax

```
snmp-server enable traps linkmode
no snmp-server enable traps linkmode
```

no - This command disables Link Up/Down traps for the entire IBP.

Default Setting

Enabled

Command Mode

Global Config

This command enables Multiple User traps. When the traps are enabled, a Multiple User Trap is sent when a user logs in to the terminal interface (EIA 232 or telnet) and there is an existing terminal interface session.

Syntax

```
snmp-server enable traps multiusers
no snmp-server enable traps multiusers
```

no - This command disables Multiple User trap.

Default Setting

Enabled

Command Mode

Global Config

9.5.5.12 snmp-server enable informs

This command enables the snmp informs for SNMPv2 and SNMPv3.

Syntax

```
snmp-server enable informs
no snmp-server enable informs
```

no - This command disables the sending of snmp informs.

Default Setting

Disabled

Command Mode

Global Config

9.5.5.13 snmp-server inform retries

This command set how many times to resend the inform.

Syntax

```
snmp-server inform retries
no snmp-server inform retries
```

no - This command restore the default setting of snmp inform retires value

Default Setting

3

Command Mode

Global Config

9.5.5.14 snmp-server inform timeout

This command set how many seconds does the switch to wait for the inform acknowledgement.

Syntax

```
snmp-server inform timeout
no snmp-server inform timeout
```

no - This command restore the default setting of snmp inform timeout value.

Default Setting

15 seconds.

Command Mode

Global Config

9.5.5.15 snmp-server user

This command create an snmp user.

Syntax

```
snmp-server user <username> auth <md5 | noauth | sha> <0-7> <pass> priv <des> <0-7> <pass>
no snmp-server user <username>
```

<username> - user name.

<md5 | noauth | sha> - authentication method.

<pass> - password.

<des> - encryption method.

no - This command delete an snmp user.

Command Mode

Global Config

9.5.5.16 snmp-server engineID

This command create an snmp engineID.

Syntax

```
snmp-server engineID remote <ipAddr | ipv6Addr> <engineid-string>
no snmp-server engineID remote <ipAddr | ipv6Addr> <engineid-string>
```

<ipAddr | ipv6Addr> - IPv4 or IPv6 address of SNMP host which will receive SNMP trap/inform from this switch.

<engineid-string> - Engin ID for the selected host. The Engined ID are up to 24 hexadecimal characters in length

no - This command delete an snmp engineID.

Command Mode

Global Config

9.5.6 SNMP Trap Commands

9.5.6.1 show snmptrap

This command displays SNMP trap receivers. Trap messages are sent across a network to an SNMP Network Manager. These messages alert the manager to events occurring within the IBP or on the network. Six trap receivers are simultaneously supported.

Syntax
show snmptrap

Default Setting

None

Command Mode

Privileged Exec

Display Message

SNMP Trap Name: The community string of the SNMP trap packet sent to the trap manager. This may be up to 64 alphanumeric characters. This string is case sensitive.

IP Address: The IP or IPv6 address to receive SNMP traps from this device.

SNMP Version: The trap version to be used by the receiver.

SNMP v1 - Uses SNMP v1 to send traps to the receiver

SNMP v2 - Uses SNMP v2 to send traps to the receiver

SNMP v3 - Uses SNMP v3 to send traps to the receiver

Status: A pull down menu that indicates the receiver's status (enabled or disabled) and allows the administrator/user to perform actions on this user entry:

Enable - send traps to the receiver

Disable - do not send traps to the receiver.

9.5.6.2 snmp trap link-status

This command enables link status traps by interface.

Note: This command is valid only when the Link Up/Down Flag is enabled. See '**snmp-server enable traps linkmode**' command.

Syntax

```
snmp trap link-status
no snmp trap link-status
```

no - This command disables link status traps by interface.

Default Setting

Disabled

Command Mode

Interface Config

This command enables link status traps for all interfaces.

Note: This command is valid only when the Link Up/Down Flag is enabled (See '**snmp-server enable traps linkmode**' command.)

Syntax

```
snmp trap link-status all
no snmp trap link-status all
```

all - All interfaces.

no - This command disables link status traps for all interfaces.

Default Setting

Disabled

Command Mode

Global Config

9.5.6.3 snmptrap <name> <ipaddr | ipv6Addr>

This command adds an SNMP trap name. The maximum length of the name is 16 case-sensitive alphanumeric characters.

Syntax

```
snmptrap <name> <ipaddr | ipv6Addr>
no snmptrap <name> <ipaddr | ipv6Addr>
```

<name> - SNMP trap name (Range: up to 64 case-sensitive alphanumeric characters).

<ipaddr | ipv6Addr> - an IP or IPv6 address of the trap receiver.

no - This command deletes trap receivers for a community.

Default Setting

None

Command Mode

Global Config

9.5.6.4 snmptrap ipaddr

This command changes the IP address of the trap receiver for the specified community name. The maximum length of name is 64 case-sensitive alphanumeric characters.

Note: IP or IPv6 addresses in the SNMP trap receiver table must be unique for the same community name. If you make multiple entries using the same IP address and community name, the first entry is retained and processed. All duplicate entries are ignored.

Syntax

```
snmptrap ipaddr <name> <ipaddr or IPv6> <new ipAddr | ipv6Addr>
```

<name> - SNMP trap name.

<ipaddr | ipv6Addr> - an original IP or IPv6 address.

<new ipAddr | ipv6Addr> - a new IP or IPv6 address.

Default Setting

None

Command Mode

Global Config

9.5.6.5 snmptrap mode

This command activates or deactivates an SNMP trap. Enabled trap receivers are active (able to receive traps). Disabled trap receivers are inactive (not able to receive traps).

Syntax

```
snmptrap mode <name> <ipaddr | ipv6Addr>
no snmptrap mode <name> <ipaddr | ipv6Addr>
```

<name> - SNMP trap name.

<ipadd | ipv6Addr> - an IP or IPv6 address.

no - This command deactivates an SNMP trap. Trap receivers are inactive (not able to receive traps).

Default Setting

None

Command Mode

Global Config

9.5.6.6 snmptrap snmpversion

This command activates or deactivates an SNMP trap. Enabled trap receivers are active (able to receive traps). Disabled trap receivers are inactive (not able to receive traps).

Syntax

```
snmptrap snmpversion <name> <ipaddr | ipv6Addr> <snmpv1|snmpv2|snmpv3>
```

<name> - SNMP trap name.

<ipadd | ipv6Addr> - an IP or IPv6 address.

snmpv1 - Use SNMP v1 to send traps.

snmpv2 - Use SNMP v2 to send traps.

Snmpv3 - Use SNMP v3 to send traps.

Default Setting

None

Command Mode

Global Config

9.5.7 SNMP Inform Commands

9.5.7.1 show snmpinform

This command displays SNMP inform receivers. Inform messages are sent across a network to an SNMP Network Manager. These messages alert the manager to events occurring within the switch or on the network.

Syntax

show snmpinform

Default Setting

None

Command Mode

Privileged Exec

Display Message

SNMP Inform Flags: Admin mode of SNMP inform function.

SNMP Inform Retries: How many times to resend the inform.

SNMP Inform Timeout: How many seconds does the switch to wait for the inform ACK.

SNMP Inform Name: The community string of the SNMP inform packet. This may be up to 64 alphanumeric characters. This string is case sensitive.

IP Address: The IP or IPv6 address to receive SNMP inform from this device.

SNMP Version: The inform version to be used by the receiver.

SNMP v2 - Uses SNMP v2 to send inform to the receiver

SNMP v3 - Uses SNMP v3 to send inform to the receiver

Status: A pull down menu that indicates the receiver's status (enabled or disabled) and allows the administrator/user to perform actions on this user entry:

Enable - send inform to the receiver

Disable - do not send inform to the receiver.

9.5.7.2 snmpinform <name> <ipaddr | ipv6Addr>

This command adds an SNMP inform name. The maximum length of the name is 64 case-sensitive alphanumeric characters.

Syntax

```
snmpinform <name> <ipaddr | ipv6Addr > [version snmpv2 | version snmpv3 <auth | noauth | priv>]
no snmpinform <name> <ipaddr | ipv6Addr >
```

<name> - SNMP inform name (Range: up to 64 case-sensitive alphanumeric characters).

<ipaddr | ipv6Addr> - an IPv4 or IPv6 address of the inform receiver.

no - This command deletes trap receivers for a community.

Default Setting

None

Command Mode

Global Config

9.5.7.3 snmpinform ipaddr

This command changes the IP or IPv6 address of the inform receiver for the specified community name. The maximum length of name is 64 case-sensitive alphanumeric characters.

Note: IP or IPv6 addresses in the SNMP inform receiver table must be unique for the same community name. If you make multiple entries using the same IP address and community name, the first entry is retained and processed. All duplicate entries are ignored.

Syntax

```
snmpinform ipaddr <name> <ipaddr | ipv6Addr> <new ipAddr | ipv6Addr>
```

<name> - SNMP inform name.

<ipaddr | ipv6Addr> - an original IPv4 or IPv6 address.

< new ipAddr | ipv6Addr> - a new IPv4 or IPv6 address.

Default Setting

None

Command Mode

Global Config

9.5.7.4 snmpinform mode

This command activates or deactivates an SNMP inform. Enabled inform receivers are active (able to receive inform). Disabled inform receivers are inactive (not able to receive inform).

Syntax

```
snmpinform mode <name> <ipaddr | ipv6Addr >
no snmpinform mode <name> <ipaddr | ipv6Addr >
```

<name> - SNMP inform name.

<ipadd | ipv6Addr **> -** an IPv4 or IPv6 address.

no - This command deactivates an SNMP inform. Inform receivers are inactive (not able to receive inform).

Default Setting

None

Command Mode

Global Config

9.5.7.5 snmpinform version

This command change an SNMP inform version.

Syntax

```
snmpinform version <name> <ipaddr | ipv6Addr> <snmpv2| snmpv3>
```

<name> - SNMP inform name.

<ipadd> - an IPv4 or IPv6 address.

snmpv2 - Use SNMP v2 to send inform.

snmpv3 - Use SNMP v3 to send inform.

Default Setting

None

Command Mode

Global Config

9.5.8 HTTP commands

9.5.8.1 show ip http

This command displays the http settings for the IBP.

Syntax

show ip http

Default Setting

None

Command Mode

Privileged Exec

Display Message

HTTP Mode (Unsecure): This field indicates whether the HTTP mode is enabled or disabled.

HTTP Port: This field specifies the port configured for HTTP.

HTTP Mode (Secure): This field indicates whether the administrative mode of secure HTTP is enabled or disabled.

Secure Port: This field specifies the port configured for secure HTTP.

Secure Protocol Level(s): The protocol level may have the values of SSL3, TSL1, or both SSL3 and TSL1.

9.5.8.2 ip javamode

This command specifies whether the IBP should allow access to the Java applet in the header frame of the Web interface. When access is enabled, the Java applet can be viewed from the Web interface. When access is disabled, the user cannot view the Java applet.

Syntax

ip javamode
no ip javamode

no - This command disallows access to the Java applet in the header frame of the Web interface. When the java mode is disabled, the user cannot view the Java applet.

Default Setting

Enable

Command Mode

Global Config

9.5.8.3 ip http port

This command is used to set the http port where port can be 1-65535 and the default is port 80.

Syntax

```
ip http port <1-65535>
no ip http port
```

<1-65535> - HTTP Port value.

no - This command is used to reset the http port to the default value.

Default Setting

80

Command Mode

Global Config

9.5.8.4 ip http server

This command enables access to the IBP through the Web interface. When access is enabled, the user can login to the IBP from the Web interface. When access is disabled, the user cannot login to the IBP 's Web server.

Disabling the Web interface takes effect immediately. All interfaces are affected.

Syntax

```
ip http server
no ip http server
```

no - This command disables access to the IBP through the Web interface. When access is disabled, the user cannot login to the IBP's Web server.

Default Setting

Enabled

Command Mode

Global Config

9.5.8.5 ip http secure-port

This command is used to set the secure HTTP port where port can be 1-65535 and the default is port 443.

Syntax

```
ip http secure-port <portid>
no ip http secure-port
```

<portid> - secure HTTP Port value.

no - This command is used to reset the secure HTTP port to the default value.

Default Setting

443

Command Mode

Global Config

9.5.8.6 ip http secure-server

This command is used to enable the secure socket layer for secure HTTP.

Syntax

```
ip http secure-server
no ip http secure-server
```

no - This command is used to disable the secure socket layer for secure HTTP.

Default Setting

Disabled

Command Mode

Global Config

9.5.8.7 ip http secure-protocol

This command is used to set protocol levels (versions). The protocol level can be set to TLS1, SSL3 or to both TLS1 and SSL3.

Syntax

```
ip http secure-protocol <protocollevel1> [protocollevel2]
no ip http secure-protocol <protocollevel1> [protocollevel2]
```

<protocollevel1 - 2> - The protocol level can be set to TLS1, SSL3 or to both TLS1 and SSL3.

no - This command is used to remove protocol levels (versions) for secure HTTP.

Default Setting

SSL3 and TLS1

Command Mode

Global Config

9.5.8.8 ip http session

This command is used to set http hard-timeout, maxsessions and soft-timeout parameters.

Syntax

```
ip http session { hard-timeout <0-168> | maxsessions <0-16> | soft-timeout <0-60> }
no ip http session { hard-timeout | maxsessions | soft-timeout }
```

hard-timeout <0-168>: Configure the hard timeout (in hours) for HTTP sessions.

maxsessions <0-16>: Configure Maximum allowable number of HTTP sessions.

soft-timeout <0-60>: Configure the soft timeout (in minutes) for HTTP sessions.

no - This command sets the session parameters to default for HTTP.

Default Setting

maxsessions: 16

hard-timeout: 24

soft-timeout: 15

Command Mode

Global Config

9.5.8.9 ip http secure-session

This command is used to set secure http hard-timeout, maxsessions and soft-timeout parameters.

Syntax

```
ip http secure-session { hard-timeout <0-168> | maxsessions <0-16> | soft-timeout <0-60> }
no ip http secure-session { hard-timeout | maxsessions | soft-timeout }
```

hard-timeout <0-168>: Configure the hard timeout (in hours) for Secure HTTP sessions.

maxsessions <0-16>: Configure Maximum allowable number of Secure HTTP sessions.

soft-timeout <0-60>: Configure the soft timeout (in minutes) for Secure HTTP sessions.

no - This command sets the session parameters to default for Secure HTTP.

Default Setting

maxsessions: 16

hard-timeout: 24

soft-timeout: 5

Command Mode

Global Config

9.5.9 Secure Shell (SSH) Commands

9.5.9.1 show ip ssh

This command displays the SSH settings.

Syntax

```
show ip ssh
```

Default Setting

None

Command Mode

Privileged Exec

Display Message

Administrative Mode: This field indicates whether the administrative mode of SSH is enabled or disabled.

Protocol Levels: The protocol level may have the values of version 1, version 2, or both versions.

SSH Sessions Currently Active: This field specifies the current number of SSH connections.

Max SSH Sessions Allowed: The maximum number of inbound SSH sessions allowed on the IBP.

SSH Timeout: This field is the inactive timeout value for incoming SSH sessions to the IBP.

9.5.9.2 ip ssh

This command is used to enable SSH.

Syntax

```
ip ssh
no ip ssh
```

no - This command is used to disable SSH.

Default Setting

Enabled

Command Mode

Global Config

9.5.9.3 ip ssh protocol

This command is used to set or remove protocol levels (or versions) for SSH. Either SSH1 (1), SSH2 (2), or both SSH 1 and SSH 2 (1 and 2) can be set.

Syntax

```
ip ssh protocol <protocollevel1> [protocollevel2]
```

<protocollevel1 - 2> - The protocol level can be set to SSH1, SSH2 or to both SSH 1 and SSH 2.

Default Setting

SSH2

Command Mode

Global Config

9.5.9.4 ip ssh maxsessions

This command specifies the maximum number of SSH connection sessions that can be established. A value of 0 indicates that no ssh connection can be established. The range is 0 to 5.

Syntax

```
ip ssh maxsessions <0-5>
no ip ssh maxsessions
```

<0-5> - maximum number of sessions.

no - This command sets the maximum number of SSH connection sessions that can be established to the default value.

Default Setting

5

Command Mode

Global Config

9.5.9.5 ip ssh timeout

This command sets the SSH connection session timeout value, in minutes. A session is active as long as the session has been idle for the value set. A value of 0 indicates that a session remains active indefinitely. The time is a decimal value from 0 to 160. Changing the timeout value for active sessions does not become effective until the session is reaccessed. Any keystroke will also activate the new timeout duration.

Syntax

```
ip ssh timeout <1-160>
no ip ssh timeout
```

<1-160> - timeout interval in seconds.

no - This command sets the SSH connection session timeout value, in minutes, to the default. Changing the timeout value for active sessions does not become effective until the session is reaccessed. Any keystroke will also activate the new timeout duration.

Default Setting

5

Command Mode

Global Config

9.5.10 DHCP Client Commands

9.5.10.1 ip dhcp restart

This command is used to initiate a BOOTP or DHCP client request.

Syntax

```
ip dhcp restart
```

Default Setting

None

Command Mode

Global Config

9.5.10.2 ip dhcp client-identifier

This command is used to specify the DHCP client identifier for this IBP. Use the no form to restore to default value.

Syntax

```
ip dhcp client-identifier {text <text> | hex <hex>}
no ip dhcp client-identifier
```

<text> - A text string. (Range: 1-15 characters).

<hex> - A hex string which format is XX:XX:XX:XX:XX:XX (X is 0-9, A-F)

no - This command is used to restore to default value.

The DHCP client identifier will be changed as the hostname is changed from MMB or CLI of Connection Blade.

Default Setting

CB.SerialNumber

Command Mode

Global Config

9.5.11 DHCPv6 Client Commands

9.5.11.1 ipv6 address protocol

This command specifies the network of IPv6 configuration protocol to be used . If you modify this value, the change is effective immediately.

Syntax

ipv6 address protocol {dhcp6 | none}

<dhcp6> - Obtains IP address from DHCPv6.

<none> - Obtains IP address by setting configuration.

Default Setting

None.

Command Mode

Interface-Vlan Config

9.5.11.2 ipv6 dhcp6 restart

This command is used to initiate a DHCPv6 client request by the network interface.

Syntax

ipv6 dhcp6 restart

Default Setting

None.

Command Mode

Global Config

9.5.11.3 oob protocol

This command specifies the oob configuration protocol to be used. If you modify this value, the change is effective immediately.

Syntax

```
oob protocol {bootp | dhcp | dhcp6 | none}
```

<bootp> - Obtains IP address from BOOTP.

<dhcp> - Obtains IP address from DHCP.

<dhcp6> - Obtains IPv6 address from DHCPv6.

<none> - Obtains IP address by setting configuration.

Default Setting

DHCP.

Command Mode

Global Config

9.5.11.4 oob protocol dhcp6 restart

This command is used to initiate a DHCPv6 client request by oob interface.

Syntax

```
oob protocol dhcp6 restart
```

Default Setting

None.

Command Mode

Global Config

9.5.12 Domain Name Server Relay Commands

9.5.12.1 Show Commands

9.5.12.1.1 show hosts

This command displays the static host name-to-address mapping table.

Syntax

show hosts

Default Setting

None

Command Mode

Privileged Exec

Display Message

Domain Name List: Domain Name.

IP Address: IPv4/IPv6 address of the Host.

9.5.12.1.2 show dns

This command displays the configuration of the DNS server.

Syntax

show dns

Default Setting

None

Command Mode

Privileged Exec

Display Message

Domain Lookup Status: Enable or disable the IP Domain Naming System (DNS)-based host name-to-address translation function.

Default Domain Name: The default domain name that will be used for querying the IPv4/IPv6 address of a host.

Domain Name List: A list of domain names that will be used for querying the IP address of a host.

Name Server List: A list of domain name servers, including IPv4 and IPv6.

Request: Number of the DNS query packets been sent.

Response: Number of the DNS response packets been received.

9.5.12.2 show dns cache

This command displays all entries in the DNS cache table.

Syntax
show dns cache

Default Setting

None

Command Mode

Privileged Exec

Display Message

Domain Name List: Domain Name

IP Address: IPv4/IPv6 address of the corresponding domain name.

TTL: Time in seconds that this entry will remain in the DNS cache table

Flag: Indicates if this entry is reliable. A value of 8 is not as reliable as a value of 10.

9.5.12.3 Configuration Commands

9.5.12.3.1 ip hosts

This command creates a static entry in the DNS table that maps a host name to an IPv4/IPv6 address.

Syntax

```
ip host <name> <ipAddr|ipv6Addr>
no ip host <name>
```

<name> - Host name.

<ipAddr|ipv6Addr> - IPv4/IPv6 address of the host.

<no> - Remove the corresponding name to IPv4/IPv6 address mapping entry.

Default Setting

None

Command Mode

Privileged Exec

9.5.12.3.2 clear hosts

This command clears the entire static host name-to-address mapping table.

Syntax

```
clear hosts
```

Default Setting

None

Command Mode

Privileged Exec

9.5.12.3.3 ip domain-name

This command defines the default domain name to be appended to incomplete host names (i.e., host names passed from a client are not formatted with dotted notation).

Syntax

```
ip domain-name <name>
no ip domain-name <name>
```

<name> - Default domain name used to complete unqualified host names. Do not include the initial period that separates an unqualified name from the domain name. (Range: 1-64 characters)

Default Setting

None

Command Mode

Privileged Exec

9.5.12.3.4 ip domain-list

This command defines the domain name that can be appended to incomplete host names (i.e., host names passed from a client are not formatted with dotted notation). The domain name table can contain maximum 6 entries.

Syntax

```
ip domain-list <name>
no ip domain-list <name>
```

<name> - Default domain name used to complete unqualified host names. Do not include the initial period that separates an unqualified name from the domain name. (Range: 1-64 characters)

When an incomplete host name is received by the DNS server on this IBP, it will work through the domain name list, append each domain name in the list to the host name, and check with the specified name servers for a match. If there is no domain name list, the domain name specified with the "*ip domain-name*" command is used. If there is a domain name list, the default domain name is not used.

Default Setting

None

Command Mode

Privileged Exec

9.5.12.3.5 ip name-server

This command specifies the address of one or more domain name servers to use for name-to-address resolution. There are maximum 6 entries in the Domain Name Server Table.

Syntax

```
ip name-server <ipaddr>
no ip name-server <ipaddr>
```

< ipaddr > - IPv4/IPv6 address of the Domain Name Servers.

<no> - Remove the corresponding Domain Name Server entry from the table.

i The listed name servers are queried in the specified sequence until a response is received, or the end of the list is reached with no response.

Default Setting

None

Command Mode

Privileged Exec

9.5.12.3.6 ip domain-lookup

This command enables the IP Domain Naming System (DNS)-based host name-to-address translation.

Syntax

```
ip domain-lookup
no ip domain-lookup
```

<no> - This command disables the IP Domain Naming System (DNS)-based host name-to-address translation.

Default Setting

None

Command Mode

Privileged Exec

9.5.12.3.7 clear domain-list

This command clears all entries in the domain name list table.

Syntax

clear domain-list

Default Setting

None

Command Mode

Privileged Exec

9.5.12.3.8 clear dns

This command sets the DNS configuration to default value.

Syntax

clear dns

Default Setting

None

Command Mode

Privileged Exec

9.5.12.3.9 clear dns cache

This command clears all entries in the DNS cache table.

Syntax

clear dns cache

Default Setting

None

Command Mode

Privileged Exec

9.5.12.3.10 clear dns counter

This command clears the statistics of all entries in the DNS cache table.

Syntax

clear dns cache

Default Setting

None

Command Mode

Privileged Exec

9.5.13 Dynamic DNS Client Commands

9.5.13.1 ddns client

This command is DDNS (Dynamic DNS) updating that notify ddns provider update the domain record. If update success, save there parameter in ddns list.

The Dynamic DNS is a method, protocol, or network service that provides the capability for a networked device using the Internet Protocol Suite, such as an IP router or computer system, to notify a domain name server to change, in real time the active DNS configuration of its configured hostnames, addresses or other information stored in DNS.

Syntax

```
ddns { dhs | dyndns | dyns | easydns | ods | tzo | zoneedit } <username> <password> <host>
[<address>]
no ddns { dhs | dyndns | dyns | easydns | ods | tzo | zoneedit } <username> <password> <host>
[<address>]
```

<no> - This command remove a ddns config from list.

Default Setting

None.

Command Mode

Global Config

9.5.13.2 show ddns

This command displays display DDNS configuration list.

Syntax
Show ddns

Default Setting

None.

Command Mode

Privileged Exec

Display Message

Server Name: The provider's name of DDNS server.

User Name: The user name for DDNS server.

Password: The password for the account.

Host: The domain name to be mapped with your IP address.

IP Address: The IP address to be mapped with your domain name.

9.5.14 IPv6 Commands

9.5.14.1 show ipv6 interface

This command displays the IBP's IPv6 network configuration.

Syntax
show ipv6 interface

Default Setting

None.

Command Mode

User Exec, Privileged Exec

Display Message

IPv6 Address: The IPv6 address of the interface.

Address mode: The network configuration of the IPv6 protocol to be used. The factory default is None.

9.5.14.2 show ipv6 traffic

Use this command to show traffic and statistics for IPv6 and ICMPv6. Specify a interface to view information about traffic on a specific interface.

Syntax

show ipv6 traffic {oob | switchport}

Default Setting

None.

Command Mode

User Exec, Privileged Exec

Display Message

Total Datagrams Received: Total number of input datagrams received by the interface, including those received in error.

Received Datagrams Locally Delivered: Total number of datagrams successfully delivered to IPv6 user-protocols (including ICMP). This counter increments at the interface to which these datagrams were addressed, which might not necessarily be the input interface for some of the datagrams.

Received Datagrams Discarded Due To Header Errors: Number of input datagrams discarded due to errors in their IPv6 headers, including version number mismatch, other format errors, hop count exceeded, errors discovered in processing their IPv6 options, etc.

Received Datagrams Discarded Due To MTU: Number of input datagrams that could not be forwarded because their size exceeded the link MTU of outgoing interface.

Received Datagrams Discarded Due To No Route: Number of input datagrams discarded because no route could be found to transmit them to their destination.

Received Datagrams With Unknown Protocol: Number of locally-addressed datagrams received successfully but discarded because of an unknown or unsupported protocol. This counter increments at the interface to which these datagrams were addressed, which might not be necessarily the input interface for some of the datagrams.

Received Datagrams Discarded Due To Invalid Address: Number of input datagrams discarded because the IPv6 address in their IPv6 header's destination field was not a valid address to be received at this entity. This count includes invalid addresses (for example, ::0) and unsupported addresses (for example, addresses with unallocated prefixes). For entities which are not IPv6 routers and therefore do not forward datagrams, this counter includes datagrams discarded because the destination address was not a local address.

Received Datagrams Discarded Due To Truncated Data: Number of input datagrams discarded because datagram frame didn't carry enough data.

Received Datagrams Discarded Other: Number of input IPv6 datagrams for which no problems were encountered to prevent to continue processing, but which were discarded (e.g., for lack of buffer space). Note that this counter does not include datagrams discarded while awaiting re-assembly.

Received Datagrams Reassembly Required: Number of IPv6 fragments received which needed to be reassembled at this interface. Note that this counter increments at the interface to which these fragments were addressed, which might not be necessarily the input interface for some of the fragments.

Datagrams Successfully Reassembled: Number of IPv6 datagrams successfully reassembled. Note that this counter increments at the interface to which these datagrams were addressed, which might not be necessarily the input interface for some of the fragments.

Datagrams Failed To Reassemble: Number of failures detected by the IPv6 reassembly algorithm (for whatever reason: timed out, errors, etc.). Note that this is not necessarily a count of discarded IPv6 fragments since some algorithms (notably the algorithm in by combining them as they are received. This counter increments at the interface to which these fragments were addressed, which might not be necessarily the input interface for some of the fragments.

Datagrams Forwarded: Number of output datagrams which this entity received and forwarded to their final destinations. In entities which do not act as IPv6 routers, this counter will include only those packets which were Source-Routed via this entity, and the Source-Route processing was successful. Note that for a successfully forwarded datagram the counter of the outgoing interface increments.

Datagrams Locally Transmitted: Total number of IPv6 datagrams which local IPv6 user protocols (including ICMP) supplied to IPv6 in requests for transmission. Note that this counter does not include any datagrams counted in ipv6IfStatsOutForwDatagrams.

Datagrams Transmit Failed: Number of output IPv6 datagrams for which no problem was encountered to prevent their transmission to their destination, but which were discarded (e.g., for lack of buffer space). Note that this counter would include datagrams counted in ipv6IfStatsOutForwDatagrams if any such packets met this (discretionary) discard criterion.

Fragments Created: Number of output datagram fragments that have been generated as a result of fragmentation at this output interface.

Datagrams Successfully Fragmented: Number of IPv6 datagrams that have been successfully fragmented at this output interface.

Datagrams Failed To Fragment: Number of IPv6 datagrams that have been discarded because they needed to be fragmented at this output interface but could not be.

Multicast Datagrams Received: Number of multicast packets received by the interface.

Multicast Datagrams Transmitted: Number of multicast packets transmitted by the interface.

Total ICMPv6 messages received: Total number of ICMP messages received by the interface which includes all those counted by ipv6IfIcmpInErrors. Note that this interface is the interface to which the ICMP messages were addressed which may not be necessarily the input interface for the messages.

ICMPv6 Messages with errors: Number of ICMP messages which the interface received but determined as having ICMP-specific errors (bad ICMP checksums, bad length, etc.).

ICMPv6 Destination Unreachable Messages: Number of ICMP Destination Unreachable messages received by the interface.

ICMPv6 Messages Prohibited Administratively: Number of ICMP destination unreachable/communication administratively prohibited messages received by the interface.

ICMPv6 Time Exceeded Messages: Number of ICMP Time Exceeded messages received by the interface.

ICMPv6 Parameter Problem Messages: Number of ICMP Parameter Problem messages received by the interface.

ICMPv6 messages with too big packets: Number of ICMP Packet Too Big messages received by the interface.

ICMPv6 Echo Request Messages Received: Number of ICMP Echo (request) messages received by the interface.

ICMPv6 Echo Reply Messages Received: Number of ICMP Echo Reply messages received by the interface.

ICMPv6 Router Solicit Messages Received: Number of ICMP Router Solicit messages received by the interface.

ICMPv6 Router Advertisement Messages Received: Number of ICMP Router Advertisement messages received by the interface.

ICMPv6 Neighbor Solicit Messages Received: Number of ICMP Neighbor Solicit messages received by the interface.

ICMPv6 Neighbor Advertisement Messages Received: Number of ICMP Neighbor Advertisement messages received by the interface.

ICMPv6 Redirect Messages Received: Number of Redirect messages received by the interface.

ICMPv6 Group Membership Query Messages Received: Number of ICMPv6 Group Membership Query messages received.

ICMPv6 Group Membership Response Messages Received: Number of ICMPv6 group Membership Response messages received.

ICMPv6 Group Membership Reduction Messages Received: Number of ICMPv6 Group Membership Reduction messages received.

Total ICMPv6 Messages Transmitted: Total number of ICMP messages which this interface attempted to send. Note that this counter includes all those counted by icmpOutErrors.

ICMPv6 Messages Not Transmitted Due To Error: Number of ICMP messages which this interface did not send due to problems discovered within ICMP such as a lack of buffers. This value should not include errors discovered outside the ICMP layer such as the inability of IPv6 to route the resultant datagram. In some implementations there may be no types of error which contribute to this counter's value.

ICMPv6 Destination Unreachable Messages Transmitted: Number of ICMP Destination Unreachable messages sent by the interface.

ICMPv6 Messages Prohibited Administratively Transmitted: Number of ICMP destination unreachable/communication administratively prohibited messages sent.

ICMPv6 Time Exceeded Messages Transmitted: Number of ICMP Time Exceeded messages sent by the interface.

ICMPv6 Parameter Problem Messages Transmitted: Number of ICMP Parameter Problem messages sent by the interface.

ICMPv6 Packet Too Big Messages Transmitted: Number of ICMP Packet Too Big messages sent by the interface.

ICMPv6 Echo Request Messages Transmitted: Number of ICMP Echo (request) messages sent by the interface.

ICMPv6 Echo Reply Messages Transmitted: Number of ICMP Echo Reply messages sent by the interface.

ICMPv6 Router Solicit Messages Transmitted: Number of ICMP Router Solicitation messages sent by the interface.

ICMPv6 Router Advertisement Messages Transmitted: Number of ICMP Router Advertisement messages sent by the interface.

ICMPv6 Neighbor Solicit Messages Transmitted: Number of ICMP Neighbor Solicitation messages sent by the interface.

ICMPv6 Neighbor Advertisement Messages Transmitted: Number of ICMP Neighbor Advertisement messages sent by the interface.

ICMPv6 Redirect Messages Transmitted: Number of Redirect messages sent. For a host, this object will always be zero, since hosts do not send redirects.

ICMPv6 Group Membership Query Messages Transmitted: Number of ICMPv6 Group Membership Query messages sent.

ICMPv6 Group Membership Response Messages Transmitted: Number of ICMPv6 group Membership Response messages sent.

ICMPv6 Group Membership Reduction Messages Transmitted: Number of ICMPv6 Group Membership Reduction messages sent.

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ICMPv6 Duplicate Address Detects: Number of duplicate addresses detected by the interface

9.5.14.3 clear ipv6 statistics

This command clear IPv6 statistics for a specific interface. IPv6 statistics display in the output of the show ipv6 traffic command.

Syntax
clear ipv6 statistics {oob | switchport}

Default Setting

None.

Command Mode

Privileged Exec

9.5.14.4 enable ipv6 stack for oob

This command is used to enable the IPv6 stack for out-of-band mgmt interface.

Syntax

```
oob ipv6 enable
no oob ipv6 enable
```

no – Disable IPv6 stack.

Default Setting

Enabled

Command Mode

Global Config

9.5.14.5 enable ipv6 stack for switchport

This command is used to enable the IPv6 stack for in-band mgmt interface.

Syntax

```
ipv6 enable
no ipv6 enable
```

no – Disable IPv6 stack.

Default Setting

Disabled

Command Mode

Global Config

9.5.15 UDLD Commands

9.5.15.1 show udld

This command uses to display the current UDLD configuration and the information of receiving neighbors for all interfaces or a specific interface.

Syntax

show udld {slot/port}

<slot/port> - Configs a specific interface.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Port enable operational state: Show the Port Enable Operational State of the selected port.

Current bidirectional state: Show the Bidirectional State of the selected port.

Current operational state: Show the runtime Operational State of the selected port. This item will be hidden if the port doesn't enable udld.

Message interval: Show the runtime Message Interval of the selected port. This section will be hidden if the port doesn't enable udld.

Timeout interval: Show the runtime Timeout Interval of the selected port. This section will be hidden if the port doesn't enable udld.

Remote Entry: Show all information of the remote entry if received.

Expiration time: Show the runtime Expiration Time of the remote entry.

Device Id: Show the Device Id associated with the remote entry.

Device Name: Show the Device Name associated with the remote entry.

Port Id: Show the Port Id associated with the remote entry.

Neighbor echo device : Show the Device Id included in Echo TLV associated with the remote entry.

Neighbor echo port: Show the Port Id included in Echo TLV associated with the remote entry.

Message Interval: Show the message interval associated with the remote entry.

Timeout Interval: Show the timeout interval associated with the remote entry.

CDP Device Name: Show the CDP Device Name associated with the remote entry.

9.5.15.2 udld aggressive

This command enables global udld aggressive mode and will work on all fiber ports except where locally configured.

Syntax

udld aggressive
no udld aggressive

no - This command is used to disable global udld aggressive mode

Default Setting

Disabled

Command Mode

Global Config

9.5.15.3 udld enable

This command enables global udld normal mode and will work on all fiber ports except where locally configured.

Syntax

udld enable
no udld enable

no - This command is used to disable global udld normal mode

Default Setting

Disabled

Command Mode

Global Config

9.5.15.4 udld message time

This command sets udld message time in the range <7-90>.

Syntax

udld message time <7-90>
no udld message time

no - This command is used to set udld message time to default value 15

Default Setting

15

Command Mode

Global Config

9.5.15.5 udld port

This command is used to enable port udld normal mode.

Syntax
udld port no udld port

no - This command is used to disable port udld normal mode

Default Setting

Disabled

Command Mode

Interface Config

This command is used to enable port udld aggressive mode.

Syntax
udld port aggressive no udld port aggressive

no - This command is used to disable port udld aggressive mode

Default Setting

Disabled

Command Mode

Interface Config

9.5.16 LLDP Commands

9.5.16.1 show lldp

This command uses to display a summary of the current LLDP configuration.

Syntax
show lldp

Default Setting

None

Command Mode

Privileged Exec

Display Message

Transmit Interval: Shows how frequently the system transmits local data LLDP frames, in seconds.

Transmit Hold Multiplier: Shows the multiplier on the transmit interval that sets the TTL in local data LLDP frames.

Re-initialization Delay: Shows the delay before re-initialization, in seconds.

Notification Interval: Shows how frequently the system sends remote data change notifications, in seconds.

Transmit Delay: Show the delay between successive LLDP frame transmissions, in seconds.

9.5.16.2 show lldp interface

This command uses to display a summary of the current LLDP configuration for a specific interface or for all interfaces.

Syntax

show lldp interface {<slot/port> | all}

<slot/port> - Configures a specific interface.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Interface: Shows the interface in a slot/port format.

Link: Shows whether the link is up or down.

Transmit: Shows whether the interface transmits LLDP frames.

Receive: Shows whether the interface receives LLDP frames.

Notify: Shows whether the interface sends remote data change notifications.

TLVs: Shows whether the interface sends optional TLVs in the LLDP frames. The TLV codes can be 0 (Port Description), 1 (System Name), 2 (System Description), or 3 (System Capability).

Mgmt: Shows whether the interface transmits system management address information in the LLDP frames.

9.5.16.3 show lldp statistics

This command uses to display the current LLDP traffic and remote table statistics for a specific interface or for all interfaces.

Syntax

show lldp statistics {<slot/port> | all}

<slot/port> - Configures a specific interface.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Last Update: Shows the amount of time since the last update to the remote table in days, hours, minutes, and seconds.

Total Inserts: Total number of inserts to the remote data table.

Total Deletes: Total number of deletes from the remote data table.

Total Drops: Total number of times the complete remote data received was not inserted due to insufficient resources.

Total Ageouts: Total number of times a complete remote data entry was deleted because the Time to Live interval expired.

The table contains the following column headings:

Interface: Shows the interface in slot/port format.

Transmit Total: Total number of LLDP frames transmitted on the port.

Receive Total: Total number of LLDP frames received on the port.

Discards: Total number of LLDP frames discarded on the port for any reason.

Errors: The number of invalid LLDP frames received on the port.

Ageouts: Total number of times a complete remote data entry was deleted for the port because the Time to Live interval expired.

TLV Discards: Shows the number of TLVs discarded.

TLV Unknowns: Total number of LLDP TLVs received on the port where the type value is in the reserved range, and not recognized.

9.5.16.4 show lldp remote-device

This command uses to display summary information about remote devices that transmit current LLDP data to the system. You can show information about LLDP remote data received on all ports or on a specific port.

Syntax

show lldp remote-device {<slot/port> | all}

<slot/port> - Displays a specific interface.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Local Interface: Identifies the interface that received the LLDP frame from the remote device.

Chassis ID: Shows the ID of the remote device.

Port ID: Shows the port number that transmitted the LLDP frame.

System Name: Shows the system name of the remote device.

9.5.16.5 show lldp remote-device detail

This command uses to display detailed information about remote devices that transmit current LLDP data to an interface on the system.

Syntax

show lldp remote-device detail <slot/port>

<slot/port> - Displays a specific interface.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Local Interface: Identifies the interface that received the LLDP frame from the remote device.

Chassis ID Subtype: Shows the type of identification used in the Chassis ID field.

Chassis ID: Identifies the chassis of the remote device.

Port ID Subtype: Identifies the type of port on the remote device.

Port ID: Shows the port number that transmitted the LLDP frame.

System Name: Shows the system name of the remote device.

System Description: Describes the remote system by identifying the system name and versions of hardware, operating system, and networking software supported in the device.

Port Description: Describes the port in an alpha-numeric format. The port description is configurable.

System Capabilities Supported: Indicates the primary function(s) of the device.

System Capabilities Enabled: Shows which of the supported system capabilities are enabled.

Management Address: For each interface on the remote device with an LLDP agent, lists the type of address the remote LLDP agent uses and specifies the address used to obtain information related to the device.

Time To Live: Shows the amount of time (in seconds) the remote device's information received in the LLDP frame should be treated as valid information.

MAC/PHY Configuration/Status

- **Auto-Negotiation** - Specifies whether the auto-negotiation is supported and whether the auto-negotiation is enabled.
- **PMD Auto-Negoration Advertised Capabilities** - Specifies the auto-negotiation and speed capabilities of the PMD.
- **Operational MAU Type** - Specifies the current duplex and speed settings of the sending system.

Power Via MDI

- **MDI Power Support** - Specifies the MDI power support capabilities of the sending IEEE 802.3 LAN station.
- **PSE Power Pair** - Specifies which pair is powered.

- **Power Class** - Specifies the required power level required.

Link Aggregation Status - Specifies the capability and current aggregation status of the link.

Link Aggregation Port Id - Specifies the aggregated port identifier.

Maximum Frame Size - Specifies the maximum supported IEEE 802.3 frame size.

Port VLAN Identity - Specifies the VLAN ID of the port.

Protocol VLAN - Specifies the Protocol VLAN ID and status.

VLAN Name - Specifies the VLAN name.

Protocol Identity - Specifies the particular protocols that are accessible through the port.

9.5.16.6 show lldp local-device

This command uses to display summary information about the advertised LLDP local data. This command can display summary information or detail for each interface.

Syntax

show lldp local-device {<slot/port> | all}

<slot/port> - Displays a specific interface.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Interface: Identifies the interface in a slot/port format.

Port ID: Shows the port ID associated with this interface.

Port Description: Shows the port description associated with the interface.

9.5.16.7 show lldp local-device detail

This command uses to display detailed information about the LLDP data a specific interface transmits.

Syntax
show lldp local-device detail <slot/port>

<slot/port> - Displays a specific interface.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Interface: Identifies the interface that sends the LLDP frame.

Chassis ID Subtype: Shows the type of identification used in the Chassis ID field.

Chassis ID: Identifies the chassis of the local device.

Port ID Subtype: Identifies the type of port on the local device.

Port ID: Shows the port number that transmitted the LLDP frame.

System Name: Shows the system name of the local device.

System Description: Describes the local system by identifying the system name and versions of hardware, operating system, and networking software supported in the device.

Port Description: Describes the port in an alpha-numeric format.

System Capabilities Supported: Indicates the primary function(s) of the device.

System Capabilities Enabled: Shows which of the supported system capabilities are enabled.

Management Address: Lists the type of address and the specific address the local LLDP agent uses to send and receive information.

9.5.16.8 lldp notification

This command uses to enable remote data change notifications.

Syntax

```
lldp notification
no lldp notification
```

no - This command is used to disable notifications.

Default Setting

Disabled

Command Mode

Interface Config

9.5.16.9 lldp notification-interval

This command is used to configure how frequently the system sends remote data change notifications. The <interval-seconds> parameter is the number of seconds to wait between sending notifications. The valid interval range is 5-3600 seconds.

Syntax

```
lldp notification-interval <interval-seconds>
no lldp notification-interval
```

<interval-seconds> - Configures the number of seconds to wait between sending notifications.

no - This command is used to return the notification interval to the default value.

Default Setting

5

Command Mode

Global Config

9.5.16.10 lldp receive

This command uses to enable the LLDP receive capability.

Syntax

```
lldp receive
no lldp receive
```

no - This command is used to return the reception of LLDP frames to the default value.

Default Setting

Disable

Command Mode

Interface Config

9.5.16.11 lldp transmit

This command uses to enable the LLDP advertise capability.

Syntax

```
lldp transmit
no lldp transmit
```

no - This command is used to return the local data transmission capability to the default.

Default Setting

Disable

Command Mode

Interface Config

9.5.16.12 lldp transmit-mgmt

This command uses to include transmission of the local system management address information in the LLDP PDUs.

Syntax

```
lldp transmit-mgmt
no lldp transmit-mgmt
```

no - This command is used to cancel inclusion of the management information in LLDP frames.

Default Setting

None

Command Mode

Interface Config

9.5.16.13 lldp transmit-tlv

This command is used to specify which optional type length values (TLVs) in the 802.1AB basic management set are transmitted in the LLDP frames. Use sys-name to transmit the system name TLV. To configure the system name, please refer to “snmp-server” command. Use sys-descto transmit the system description TLV. Use sys-cap to transmit the system capabilities TLV. Use port-desc to transmit the port description TLV. To configure the port description, please refer to “description” command. Use org-spec to transmit the organization specific TLV.

Syntax

```
lldp transmit-tlv [sys-desc] [sys-name] [sys-cap] [port-desc] [org-spec]
no lldp transmit-tlv [sys-desc] [sys-name] [sys-cap] [port-desc] [org-spec]
```

no - This command is used to remove an optional TLV from the LLDP frames. Use the command without parameters to remove all optional TLVs from the LLDP frame.

Default Setting

None

Command Mode

Interface Config

9.5.16.14 lldp timers

This command is used to set the timing parameters for local data transmission on ports enabled for LLDP. The <interval-seconds> determines the number of seconds to wait between transmitting local data LLDP frames. The range is 1-32768 seconds. The <hold-value> is the multiplier on the transmit interval that sets the TTL in local data LLDP frames. The multiplier range is 2-10. The <reinit-seconds> is the delay before re-initialization, and the range is 1-0 seconds.

Syntax

```
lldp timers [interval <interval-seconds>] [hold <hold-value>] [reinit <reinit-seconds>]
no lldp timers [interval] [hold] [reinit]
```

<interval-seconds> - Configures the number of seconds to wait between transmitting local data LLDP frames.

<hold-value> - Configures the multiplier on the transmit interval that sets the TTL in local data LLDP frames.

<reinit-seconds> - Configures the delay before re-initialization.

no - This command is used to return any or all timing parameters for local data transmission on ports enabled for LLDP to the default values.

Default Setting

Interval-seconds: 30

Hold-value: 4

Reinit-seconds: 2

Command Mode

Global Config

9.5.16.15 lldp tx-delay

This command is used to set the timing parameters for data transmission delay on ports enabled for LLDP. The <delay-seconds> determines the number of seconds to wait between transmitting local data LLDPDUs. The range is 1-8192 seconds.

Syntax

```
lldp tx-delay <delay-seconds>
no lldp tx-delay
```

no - This command is used to return return the transmit delay to the default value.

Default Setting

2

Command Mode

Global Config

9.5.17 sFlow Commands

9.5.17.1 show sflow agent

The sFlow agent collects time-based sampling of network interface statistics and flow-based samples. These are sent to the configured sFlow receivers. Use this command to display the sFlow agent information.

Syntax
show sflow agent

Default Setting

None

Command Mode

Privileged Exec

Display Message

sFlow Version: Uniquely identifies the version and implementation of this MIB. The version string must have the following structure: MIB Version; Organization; Software Revision where:

- MIB Version: '1.3', the version of this MIB.
- Organization: Broadcom Corp.
- Revision: 3.0

IP Address: The IP address associated with this agent.

9.5.17.2 show sflow pollers

Use this command to display the sFlow polling instances created on the switch.

Syntax

show sflow pollers

Default Setting

None

Command Mode

Privileged Exec

Display Message

Poller Data Source: The sFlowDataSource (slot/port) for this sFlow poller. This agent will support Physical ports only.

Receiver Index: The sFlowReceiver associated with this sFlow counter poller.

Poller Interval: The number of seconds between successive samples of the counters associated with this data source.

9.5.17.3 show sflow receivers

Use this command to display configuration information related to the sFlow receivers.

Syntax

show sflow receivers [<index>]

<index> - Receiver index.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Receiver Index: The sFlow Receiver associated with the sampler/poller.

Owner String: The identity string for receiver, the entity making use of this sFlowRcvrTable entry.

Time Out: The time (in seconds) remaining before the receiver is released and stops sending samples to sFlow receiver.

Max Datagram Size: The maximum number of bytes that can be sent in a single sFlow datagram.

Port: The destination Layer4 UDP port for sFlow datagrams.

IP Address: The sFlow receiver IP address.

Address Type: The sFlow receiver IP address type. For an IPv4 address, the value is 1 and for an IPv6 address, the value is 2.

Datagram Version: The sFlow protocol version to be used while sending samples to sFlow receiver.

9.5.17.4 show sflow samplers

Use this command to display the sFlow sampling instances created on the switch.

Syntax
show sflow samplers

Default Setting

None

Command Mode

Privileged Exec

Display Message

Sampler Data Source: The sFlowDataSource (slot/port) for this sFlow sampler. This agent will support Physical ports only.

Receiver Index: The sFlowReceiver configured for this sFlow sampler.

Packet Sampling Rate: The statistical sampling rate for packet sampling from this source.

Max Header Size: The maximum number of bytes that should be copied from a sampled packet to form a flow sample.

9.5.17.5 sflow receiver

Use this command to configure the sFlow collector parameters (owner string, receiver timeout, max datagram size, IP address, and port).

Syntax

```
sflow receiver <rcvr_idx> {owner <owner-string> timeout <rcvr_timeout>} | {maxdatagram <size>} | {ip <ipv4/ipv6>} | {port <port>}
no sflow receiver <rcvr_idx> [ ip | maxdatagram | port ]
```

<rcvr_idx> - Receiver Index. The range is 1-8.

<owner-string> - The identity string for the receiver, the entity making use of this sFlowRcvrTable entry. The range is 127 characters. The default is a null string. The empty string indicates that the entry is currently unclaimed and the receiver configuration is reset to the default values. An entity wishing to claim an sFlowRcvrTable entry must ensure that the entry is unclaimed before trying to claim it. The entry is claimed by setting the owner string to a non-null value. The entry must be claimed before assigning a receiver to a sampler or poller.

<rcvr_timeout> - The time, in seconds, remaining before the sampler or poller is released and stops sending samples to receiver. A management entity wanting to maintain control of the sampler is responsible for setting a new value before the old one expires. The allowed range is 0-4294967295 seconds. The default is zero (0).

<size> - The maximum number of data bytes that can be sent in a single sample datagram. The management entity should set this value to avoid fragmentation of the sFlow datagrams. The allowed range is 200 to 9116). The default is 1400.

<ipv4/ipv6> - The sFlow receiver IP address. If set to 0.0.0.0, no sFlow datagrams will be sent. The default is 0.0.0.0.

<port> - The destination Layer4 UDP port for sFlow datagrams. The range is 1-65535. The default is 6343..

no - Use this command to set the sFlow collector parameters back to the defaults.

Default Setting

None

Command Mode

Global Config

9.5.17.6 sflow sampler

A data source configured to collect flow samples is called a poller. Use this command to configure a new sFlow sampler instance for this data source if <rcvr_idx> is valid.

Syntax

```
sflow sampler {<rcvr-indx> | rate <sampling-rate> | maxheadersize <size>}
no sflow sampler [rate | maxheadersize]
```

<rcvr_idx> - The sFlow Receiver for this sFlow sampler to which flow samples are to be sent. A value of zero (0) means that no receiver is configured, no packets will be sampled. Only active receivers can be set. If a receiver expires, then all samplers associated with the receiver will also expire. Possible values are 1-8. The default is 0.

<size> - The maximum number of bytes that should be copied from the sampler packet. The range is 20-256. The default is 128. When set to zero (0), all the sampler parameters are set to their corresponding default value.

<sampling-rate> - The statistical sampling rate for packet sampling from this source. A sampling rate of 1 counts all packets. A value of zero (0) disables sampling. A value of N means that out of N incoming packets, 1 packet will be sampled. The range is 1024-65536 and 0. The default is 0.

no - Use this command to reset the sFlow sampler instance to the default settings.

Default Setting

None

Command Mode

Interface Config

9.5.17.7 sflow poller

A data source configured to collect counter samples is called a poller. Use this command to enable a new sFlow poller instance for this data source if <rcvr_idx> is valid.

Syntax

```
sflow poller {<rcvr-indx> | interval <poll-interval>}
no sflow poller [ interval <poll-interval>]
```

<rcvr_idx> - Enter the sFlow Receiver associated with the sampler/poller. A value of zero (0) means that no receiver is configured. The range is 1-8. The default is 0.

<poll-interval> - Enter the sFlow instance polling interval. A poll interval of zero (0) disables counter sampling. When set to zero (0), all the poller parameters are set to their corresponding default value. The range is 0- 86400. The default is 0. A value of N means once in N seconds a counter sample is generated.

no - Use this command to reset the sFlow poller instance to the default settings.

Default Setting

None

Command Mode

Interface Config

9.6 System Log Management Commands

9.6.1 Show Commands

9.6.1.1 show logging

This command displays logging.

Syntax
show logging

Default Setting

None

Command Mode

Privileged Exec

Display Message

Logging Client Local Port: The port on the collector/relay to which syslog messages are sent

CLI Command Logging: The mode for CLI command logging.

Hide Password: The mode for hiding password command logging.

Console Logging: The mode for console logging.

Console Logging Severity Filter: The minimum severity to log to the console log. Messages with an equal or lower numerical severity are logged.

Buffered Logging: The mode for buffered logging.

Syslog Logging: The mode for logging to configured syslog hosts. If set to disable logging stops to all syslog hosts.

Terminal monitor: The mode for terminal logging.

Terminal Logging Severity Filter: The minimum severity to log to the terminal log. Messages with an equal or lower numerical severity are logged.

Log Messages Received: The number of messages received by the log process. This includes messages that are dropped or ignored

Log Messages Dropped: The number of messages that could not be processed.

Log Messages Relayed: The number of messages that are relayed.

Log Messages Ignored: The number of messages that are ignored.

9.6.2 show logging buffered

This command displays the message log maintained by the IBP. The message log contains system trace information.

Syntax

show logging buffered

Default Setting

None

Command Mode

Privileged Exec

Display Message

Buffered (In-Memory) Logging: Display the message log is enabled or disabled.

Buffered Logging Wrapping Behavior: Display the wrapping behavior is enabled or not.

Buffered Log Count: Display how many messages have been logged.

Message: The message that has been logged.

Message log information will not be retained across an IBP reset.

9.6.3 show logging traplog

This command displays the trap log maintained by the IBP. The trap log contains a maximum of 256 entries that wrap.

Syntax
show logging traplogs

Default Setting

None

Command Mode

Privileged Exec

Display Message

Number of Traps since last reset: The number of traps that have occurred since the last reset of this device.

Trap Log Capacity: The maximum number of traps that could be stored in the IBP.

Log: The sequence number of this trap.

System Up Time: The relative time since the last reboot of the IBP at which this trap occurred.

Trap: The relevant information of this trap.

Trap log information will not be retained across an IBP reset.

9.6.3.1 show logging hosts

This command displays all configured logging hosts.

Syntax
show logging hosts

Default Setting

None

Command Mode

Privileged Exec

Display Message

Index (used for deleting)

IP Address/Hostname: IPv4/IPv6 address or Hostname of the configured server.

Type: Logging Host Address Type (ipv4, ipv6, dns or dnsv6).

Severity: The minimum severity to log to the specified address.

Port: This is the port on the local host from which syslog messages are sent.

Status: The state of logging to configured syslog hosts. If the status is disable, no logging occurs.

9.6.4 Configuration Commands

9.6.4.1 logging buffered

This command enables logging to in-memory log where up to 128 logs are kept.

Syntax

```
logging buffered
no logging buffered
```

no - This command disables logging to in-memory log.

Default Setting

None

Command Mode

Global Config

This command enables wrapping of in-memory logging when full capacity reached. Otherwise when full capacity is reached, logging stops.

Syntax

```
logging buffered wrap
no logging buffered wrap
```

no - This command disables wrapping of in-memory logging when full capacity reached.

Default Setting

None

Command Mode

Global Config

9.6.4.2 logging console

This command enables logging to the console.

Syntax

```
logging console [<severitylevel> | <0-7>]
no logging console
```

[<severitylevel> | <0-7>] - The value is specified as either an integer from 0 to 7 or symbolically through one of the following keywords: emergency (0), alert (1), critical (2), error (3), warning (4), notice (5), informational (6), debug (7).

no - This command disables logging to the console.

Default Setting

None

Command Mode

Global Config

9.6.4.3 logging monitor

The command enables logging to the terminal monitor.

Syntax

```
logging monitor [<severitylevel> | <0-7>]
no logging monitor
```

[<severitylevel> | <0-7>] - The value is specified as either an integer from 0 to 7 or symbolically through one of the following keywords: emergency (0), alert (1), critical (2), error (3), warning (4), notice (5), informational (6), debug (7).

no - This command disables logging to the terminal monitor.

Default Setting

None

Command Mode

Global Config

9.6.4.4 terminal monitor

This command enable logging for terminal session.

Syntax

terminal monitor
no terminal monitor

no - This command disables logging to the terminal session.

Default Setting

None

Command Mode

Privileged Exec

9.6.4.5 logging host

This command enables logging to a host where up to eight hosts can be configured.

Syntax

logging host <ipAddr|ipv6Addr|name> <addresstype> [<port>] [[<severitylevel> | <0-7>]]

<ipAddr|ipv6Addr|name> - IPv4/IPv6 address or Hostname of the log server.

<addresstype> - Logging Host Address Type (ipv4, ipv6, dns or dnsv6).

<port> - Port number.

[<severitylevel> | <0-7>] - The value is specified as either an integer from 0 to 7 or symbolically through one of the following keywords: emergency (0), alert (1), critical (2), error (3), warning (4), notice (5), informational (6), debug (7).

Default Setting

None

Command Mode

Global Config

This command disables logging to hosts.

Syntax

logging host remove <hostindex>

<hostindex> - Index of the log server.

Default Setting

None

Command Mode

Global Config

This command reconfigures the IP address of the log server.

Syntax

logging host reconfigure <hostindex> {host <ipAddr|ipv6Addr|hostname> <addresstype> | port <port> | severitylevel <level>}

<hostindex> - Index of the log server.

host - Change New Logging Host IP Address.

<ipAddr|ipv6Addr|hostname> - New IPv4/IPv6 address or Hostname of the log server.

<addresstype> - Logging Host Address Type (ipv4, ipv6, dns or dnsv6).

port - Change New Logging Host Port.

<port> - New port value in the range <1 - 65535>.

severitylevel - Change New Logging Host Severity Level.

[<severitylevel> | <0-7>] - New value is specified as either an integer from 0 to 7 or symbolically through one of the following keywords: emergency (0), alert (1), critical (2), error (3), warning (4), notice (5), informational (6), debug (7).

Default Setting

None

Command Mode

Global Config

9.6.4.6 logging syslog

This command enables syslog logging.

Syntax

```
logging syslog
no logging syslog
```

no - Disables syslog logging.

Default Setting

None

Command Mode

Global Config

This command sets the local port number of the LOG client for logging messages.

.

Syntax

```
logging syslog port <portid>
no logging syslog port
```

no - Resets the local logging port to the default.

<portid> - Port ID from 1 to 65535

Default Setting

None

Command Mode

Global Config

9.6.4.7 logging cli-command

The command enable cli command logging.

Syntax

```
logging cli-command [hidepwd]
no logging cli-command [hidepwd]
```

hidepwd- enable hide password in cli command logging.

no - Disables syslog logging.

Default Setting

None

Command Mode

Global Config

9.6.4.8 clear logging buffered

This command clears all in-memory log.

Syntax

```
clear logging buffered
```

Default Setting

None

Command Mode

Global Config

9.7 Script Management Commands

9.7.1 script apply

This command applies the commands in the configuration script to the IBP. The apply command backs up the running configuration and then starts applying the commands in the script file. Application of the commands stops at the first failure of a command.

Syntax

```
script apply <scriptname>
```

<scriptname> - The name of the script to be applied.

Default Setting

None

Command Mode

Privileged Exec

9.7.2 script delete

This command deletes a specified script or all the scripts presented in the IBP.

Syntax

```
script delete {<scriptname> | all}
```

<scriptname> - The name of the script to be deleted.

all - Delete all scripts presented in the IBP

Default Setting

None

Command Mode

Privileged Exec

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9.7.3 script list

This command lists all scripts present on the IBP as well as the total number of files present.

Syntax

```
script list
```

Default Setting

None

Command Mode

Privileged Exec

The maximum combined size of all script files can not exceed 2 MByte.

9.7.4 script show

This command displays the content of a script file.

Syntax

```
script show <scriptname>
```

<scriptname> - Name of the script file.

Default Setting

None

Command Mode

Privileged Exec

9.8 System Utilities

9.8.1 clear

9.8.1.1 clear arp

This command causes all ARP entries of type dynamic to be removed from the ARP cache.

Syntax
clear arp

Default Setting

None

Command Mode

Privileged Exec

9.8.1.2 clear traplog

This command clears the trap log.

Syntax
clear traplog

Default Setting

None

Command Mode

Privileged Exec

9.8.1.3 clear eventlog

This command is used to clear the event log, which contains error messages from the system.

Syntax

clear eventlog

Default Setting

None

Command Mode

Privileged Exec

9.8.1.4 clear logging buffered

This command is used to clear the message log maintained by the IBP. The message log contains system trace information.

Syntax

clear logging buffered

Default Setting

None

Command Mode

Privileged Exec

9.8.1.5 clear config

This command resets the configuration to the factory defaults without powering off the IBP. The IBP is automatically reset when this command is processed. You are prompted to confirm that the reset should proceed.

Syntax

clear config

Default Setting

None

Command Mode

Privileged Exec

9.8.1.6 clear config interface

This command resets the interface configuration to the factory defaults without powering off the switch. You are prompted to confirm that the reset should proceed.

Syntax

clear config interface <slot/port>

<slot/port> - is the desired interface number.

Default Setting

None

Command Mode

Privileged Exec

9.8.1.7 clear pass

This command resets all user passwords to the factory defaults without powering off the IBP. You are prompted to confirm that the password reset should proceed.

Syntax

```
clear pass
```

Default Setting

None

Command Mode

Privileged Exec

9.8.1.8 clear counters

This command clears the stats for a specified <slot/port> or for all the ports or for the entire IBP based upon the argument.

Syntax

```
clear counters [<slot/port> | all]
```

<slot/port> - is the desired interface number.

all - All interfaces.

Default Setting

None

Command Mode

Privileged Exec

9.8.1.9 clear dns counter

This command clears the DNS statistics.

Syntax

clear dns counter

Default Setting

None

Command Mode

Privileged Exec

9.8.1.10 clear dns cache

This command clears all entries from the DNS cache.

Syntax

clear dns cache

Default Setting

None

Command Mode

Privileged Exec

9.8.1.11 enable passwd

This command changes Privileged EXEC password.

Syntax

```
enable passwd {0 | 7} <password>
```

0 - Specifies password in plain text.

7 - Specifies password in encrypted form.

Default Setting

None

Command Mode

Global Config.

9.8.1.12 clear igmp snooping

This command clears the tables managed by the IGMP Snooping function and will attempt to delete these entries from the Multicast Forwarding Database.

Syntax

```
clear igmp snooping
```

Default Setting

None

Command Mode

Privileged Exec

9.8.1.13 clear mld snooping

This command clears the tables managed by the MLD Snooping function and will attempt to delete these entries from the Multicast Forwarding Database.

Syntax

clear mld snooping

Default Setting

None

Command Mode

Privileged Exec

9.8.1.14 clear port-channel

This command clears all port-channels (LAGs).

Syntax

clear port-channel

Default Setting

None

Command Mode

Privileged Exec

9.8.1.15 clear port-security dynamic

This command clears all port-security dynamic information.

Syntax

clear port-security dynamic {address <mac-addr> | interface <slot/port>}

address - Clear dynamic address by MAC address.

<mac-addr> - MAC address.

interface - Clear dynamic address by interface.

<slot/port> - is the desired interface number.

Default Setting

None

Command Mode

Privileged Exec

9.8.1.16 clear ip filter

This command is used to clear all ip filter entries.

Syntax

clear ip filter

Default Setting

None

Command Mode

Privileged Exec

9.8.1.17 clear ipv6 statistics

This command resets the IPv6 statistics.

Syntax

clear ipv6 statistics {oob | switchport}

oob - Clear the IPv6 Statistics of out-of-bound.

switchport - Clear the IPv6 Statistics of inbound.

Default Setting

None

Command Mode

Privileged Exec

9.8.1.18 clear dot1x statistics

This command resets the 802.1x statistics for the specified port or for all ports.

Syntax

clear dot1x statistics {all | <slot/port>}

<slot/port> - is the desired interface number.

all - All interfaces.

Default Setting

None

Command Mode

Privileged Exec

9.8.1.19 clear radius statistics

This command is used to clear all RADIUS statistics.

Syntax

clear radius statistics

Default Setting

None

Command Mode

Privileged Exec

9.8.1.20 clear tacacs

This command is used to clear TACACS+ configuration.

Syntax

clear tacacs

Default Setting

None

Command Mode

Privileged Exec

9.8.1.21 clear lldp

This command is used to clear LLDP statistics.

Syntax

clear lldp {remote-data | statistics}

remote-data - Clear the lldp remote-data.

statistics - Clear the lldp statistics.

Default Setting

None

Command Mode

Privileged Exec

9.8.2 copy

This command uploads and downloads to/from the IBP. Local URLs can be specified using tftp or xmodem. The following can be specified as the source file for uploading from the IBP: startup config (startup-config), event log (eventlog), message log (msglog) and trap log (traplog). A URL is specified for the destination.

The command can also be used to download the startup config or code image by specifying the source as a URL and destination as startup-config or image respectively.

The command can be used to the save the running config to flash by specifying the source as running-config and the destination as startup-config {*filename*}.

The command can also be used to download ssh key files as sshkey-rsa, sshkey-rsa2, and sshkey-dsa and http secure-server certificates as sslpem-root, sslpem- server, sslpem-dhweak, and sslpem-dhstrong.

9.8.2.1 Files upload to PC

Syntax

```
copy startup-config <sourcefilename> <url>
copy {errorlog | log | traplog} <url>
copy script <sourcefilename> <url>
copy image <filename> <url>

where <url>={xmodem | tftp://ipaddr/path/file | ftp://user:pass@ipaddr/path/file}
```

<sourcefilename> - The filename of a configuration file or a script file.

<url> - xmodem or tftp://ipaddr/path/file or ftp://user:pass@ipaddr/path/file.

errorlog - event Log file.

log - message Log file.

traplog - trap Log file.

<filename> - name of the configuration or image file.

Default Setting

None

Command Mode

Privileged Exec

9.8.2.2 Files download from PC to board

Syntax

```
copy <url> boot-rom
copy <url> startup-config <destfilename>
copy <url> image <destfilename>
copy <url> {sshkey-rsa1 | sshkey-rsa2 | sshkey-dsa}
copy <url> {sslpem-root | sslpem-server | sslpem-dhweak | sslpem-dhstrong}
copy <url> script <destfilename>

where <url>={xmodem | tftp://ipaddr/path/file | ftp://user:pass@ipaddr/path/file}
```

<destfilename> - name of the image file or the script file.

<url> - xmodem or tftp://ipaddr/path/file or ftp://user:pass@ipaddr/path/file.

sshkey-rsa1 - SSH RSA1 Key file.

sshkey-rsa2 - SSH RSA2 Key file.

sshkey-dsa - SSH DSA Key file.

sslpem-root - Secure Root PEM file.

sslpem-server - Secure Server PEM file.

sslpem-dhweak - Secure DH Weak PEM file.

sslpem-dhstrong - Secure DH Strong PEM file.

Default Setting

None

Command Mode

Privileged Exec

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9.8.2.3 Write running configuration file into flash

Syntax

```
copy running-config startup-config [filename]
```

<filename> - name of the configuration file.

Default Setting

None

Command Mode

Privileged Exec

9.8.2.4 This command upload or download the pre-login banner file

Syntax

```
copy clibanner <url>
copy <url> clibanner
no clibanner
```

<url> - xmodem or tftp://ipaddr/path/file or ftp://user:pass@ipaddr/path/file.

no - Delete CLI banner.

Default Setting

None

Command Mode

Privileged Exec

9.8.2.5 Copies system configuration file

Syntax

copy file running-config

Default Setting

None

Command Mode

Privileged Exec

9.8.3 delete

This command is used to delete a configuration or image file.

Syntax

```
delete <filename>
```

<filename> - name of the configuration or image file.

Default Setting

None

Command Mode

Privileged Exec

9.8.4 dir

This command is used to display a list of files in Flash memory.

Syntax

dir [boot-rom | config | opcode [<filename>]]

<filename> - name of the configuration or image file.

boot-rom - bootrom.

config - configuration file.

opcode - run time operation code.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Column Heading	Description
date	The date that the file was created.
file name	The name of the file.
file type	File types: Boot-Rom, Operation Code, and Config file.
startup	Shows if this file is used when the system is started.
size	The length of the file in bytes.

9.8.5 whichboot

This command is used to display which files were booted when the system powered up.

Syntax
whichboot

Default Setting

None

Command Mode

Privileged Exec

Display Message

Boot-System: Current boot mode.

Next Booting Mode: Next boot mode after reboot.

file name: name of the configuration or image file.

file type: Boot-Rom image, Operation Code or Configuration file.

startup: use in booting

size (byte): size of the configuration or image file.

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9.8.6 boot-system

This command is used to specify the file or image used to start up the system.

Syntax

boot-system {boot-rom | config | opcode | auto-copy-sw} <filename>
boot-system mode {switch | IBP}

<filename> - name of the configuration or image file.

boot-rom - bootrom.

config - configuration file.

opcode - run time operation code.

mode - switch to Switch or IBP.

(*)auto-copy-sw - Configure auto-upgrade function for the stack system.

Note: (*) is the stacking command.

Default Setting

None

Command Mode

Privileged Exec

9.8.7 classic-view

This command is used to change the displayed interface identifier. As the classic-view is enabled, the reprentation of the interface identifier is changed to <slot/port> format. Use 'no classic-view' to restore to default UAN display format.

Syntax

classic-view
no classic-view

Default Setting

The displayed interface identifier use the UAN in default.

Command Mode

Privileged Exec

9.8.8 ping

This command checks if another computer is on the network and listens for connections. To use this command, configure the IBP for network (in-band) connection. The source and target devices must have the ping utility enabled and running on top of TCP/IP. The IBP can be pinged from any IP workstation with which the IBP is connected through the default VLAN (VLAN 1), as long as there is a physical path between the IBP and the workstation. The terminal interface sends, three pings to the target station.

Syntax

```
ping <host>
```

<host> - A host name or an IP address.

Default Setting

None

Command Mode

Privileged Exec

9.8.8.1 Ping on changing parameter value

Syntax

```
ping <host> count <0-20000000> [size <32-512>]
ping <host> size <32-512> [count <0-20000000>]
```

<host> - A host name or an IP address.

<0-20000000> - number of pings (Range: 0 - 20000000). Note that 0 means infinite.

<size> - packet size (Range: 32 - 512).

Default Setting

Count = 5

Size = 32

Command Mode

Privileged Exec

9.8.8.2 Ping an IPv6 address

Syntax

ping ipv6 <ipv6-address|hostname>

<ipv6-address|hostname**> -** IPv6 address or Hostname.

Default Setting

None

Command Mode

Privileged Exec

9.8.8.3 Ping a Link-local address to use interface keyword

Syntax

ping ipv6 interface {oob | switchport} <link-local-address> [size <datagram-size>]

oob - interface of out-of-band.

switchport - interface of in-band.

<link-local-address> - a link-loacl address.

<datagram-size> - Datagram size (Range: 48-2048).

Default Setting

None

Command Mode

Privileged Exec

9.8.9 traceroute

This command is used to discover the routes that packets actually take when traveling to their destination through the network on a hop-by-hop basis. <ipaddr> should be a valid IP address. [port] should be a valid decimal integer in the range of 0(zero) to 65535. The default value is 33434. The optional port parameter is the UDP port used as the destination of packets sent as part of the traceroute. This port should be an unused port on the destination system.

Syntax

traceroute <ipaddr|hostname> [initTtl <1-255>] [maxTtl <1-255>] [interval <1-60>] [count <1-10>]
traceroute ipv6 <ipv6-address|hostname> [initTtl <1-255>] [maxTtl <1-255>] [interval <1-60>] [count <1-10>]

<ipaddr|hostname> - A host name or an IP address.

initTtl - Initital TTL to be used.

<1-255> - Range: 1-255.

maxTtl - Maximum TTL for the destination.

<1-255> - Range: 1-255.

Interval - Time between probes in seconds.

<1-60> - Range: 1-60.

count - Number of probes per hop.

<1-10> - Range: 1-10.

<ipv6-address|hostname> - IPv6 address or Hostname.

Default Setting

initTtl = 1

maxTtl = 20

interval = 3

count = 3

Command Mode

Privileged Exec

9.8.10 logging cli-command

This command enables the CLI command Logging feature. The Command Logging component enables the IBP to log all Command Line Interface (CLI) commands issued on the system.

Syntax

logging cli-command

Default Setting

None

Command Mode

Global Config

9.8.11 calendar set

This command is used to set the system clock.

Syntax

calendar set <mm/dd/yyyy> <hh:mm:ss>

<mm/dd/yyyy> - Month. (Range: 1 - 12), Day of month. (Range: 1 - 31),Year (4-digit). (Range: 2000 - 2099).

<hh:mm:ss> - hh in 24-hour format (Range: 0 - 23), mm (Range: 0 - 59), ss (Range: 0 - 59)

Default Setting

None

Command Mode

Privileged Exec

9.8.12 reload

This command resets the IBP without powering it off. Reset means that all network connections are terminated and the boot code executes. The IBP uses the stored configuration to initialize the IBP. You are prompted to confirm that the reset should proceed. A successful reset is indicated by the LEDs on the IBP.

Syntax

reload [slot <unit>]

(*)slot - Reload stack or an IBP in the stack.

(*)<unit> - switch ID in the range of 1 to 8 or CB name.

Note: (*) is the stacking commands.

Default Setting

None

Command Mode

Privileged Exec

9.8.13 configure

This command is used to activate global configuration mode

Syntax

configure

Default Setting

None

Command Mode

Privileged Exec

9.8.14 disconnect

This command is used to close a telnet session.

Syntax

```
disconnect {<0-42> | all}
```

<0-42> - remote session ID.

all - all remote sessions.

Default Setting

None

Command Mode

Privileged Exec

9.8.15 hostname

This command is used to set the prompt string.

Syntax

```
hostname <prompt_string>
```

< prompt_string > - Prompt string.

Default Setting

CB

Command Mode

Global Config

9.8.16 pager

This command is used to enable/disable pager setting.

Syntax
pager no pager

no - This command disable pager function.

Default Setting

None

Command Mode

Privileged Exec

9.8.17 do

This command is used to execute Privileged EXEC-level command from global configuration mode or any configuration sub-mode.

Syntax

do [EXEC-level command]

[EXEC-level command] - Privileged EXEC-level command in Privileged Exec Command Mode.

Default Setting

None

Command Mode

Global Config, any configuration submode

9.8.18 quit

This command is used to exit a CLI session.

Syntax

quit

Default Setting

None

Command Mode

Privileged Exec

9.9 User Account Management Commands

9.9.1 Show Commands

9.9.1.1 show users

This command displays the configured user names and their settings. This command is only available for users with readwrite privileges. The SNMPv3 fields will only be displayed if SNMP is available on the system.

Syntax
show users

Default Setting

None

Command Mode

Privileged Exec

Display Message

User Name: The name the user will use to login using the serial port, Telnet or Web. A new user may be added to the IBP by entering a name in a blank entry. The user name may

be up to eight characters, and is not case sensitive. Two users are included as the factory

default, admin, and guest.

User Access Mode: Shows whether the operator is able to change parameters on the IBP (Read/Write) or is only able to view them (Read Only). As a factory default, admin has Read/Write access and guest has Read Only access. There can only be one Read/Write user and up to five Read Only users.

SNMPv3 Access Mode: This field displays the SNMPv3 Access Mode. If the value is set to **Read-Write,** the SNMPv3 user will be able to set and retrieve parameters on the system. If the value is set to **Read Only,** the SNMPv3 user will only be able to retrieve parameter information. The SNMPv3 access mode may be different from the CLI and Web access mode.

SNMPv3 Authentication: This field displays the authentication protocol to be used for the specified login user.

SNMPv3 Encryption: This field displays the encryption protocol to be used for the specified login user.

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9.9.1.2 show users authorization

This command displays all users and all authorization login information. It also displays the authorization login list assigned to the default user.

Syntax

show users authorization

Default Setting

None

Command Mode

Privileged Exec

Display Message

User: This field lists every user that has an authorization login list assigned.

System Login: This field displays the authorization login list assigned to user for system login.

802.1x: This filed displays the authentication login list assigned to the user for 802.1x port security.

9.9.1.3 show password configuration

Use this command to display the configuration password management settings.

Syntax
show password configuration

Default Setting

None

Command Mode

Privileged Exec

Display Message

Minimum Password Length: Minimum number of characters required when changing passwords**.**

9.9.2 Configuration Commands

9.9.2.1 username

This command adds a new user (account) if space permits. The account <username> can be up to eight characters in length. The name may be comprised of alphanumeric characters as well as the dash ('-') and underscore ('_'). The <username> is not case-sensitive.

Six user names can be defined.

This command changes the password of an existing operator. User password should not be more than eight characters in length. If a user is authorized for authentication or encryption is enabled, the password must be eight alphanumeric characters in length. The username and password are not case-sensitive. When a password is changed, a prompt will ask for the operator's former password. If none, press enter.

This command also can assign a privilege level to an account and privilege level range is from 0 to 15. The privilege level is define the access right of account and the default level is 1 when creating user account. Level 15 is the highest level and own read and write access right and other level only own read access right in default.

Syntax

```
username <username> {privilege <0-15> | {password <0|7> <password> | nopassword} [privilege
<0-15>]}
no username <username> [privilege]
```

<username> - is a new user name (Range: up to 8 characters).

no - This command removes a user name created before.

Note: The admin user account cannot be deleted.

nopassword - This command sets the password of an existing operator to blank. When a password is changed, a prompt will ask for the operator's former password. If none, press enter.

privilege level - This command sets privilege level for user account.

no username <username> privilege - This command set user's privilege level to default.

Note: The default privilege level is 1 and default privilege level of admin user account is 15.

Default Setting

No password, privilege level=1

Command Mode

Global Config

9.9.2.2 username snmpv3 authentication

This command specifies the authentication protocol to be used for the specified login user. The valid authentication protocols are **none**, **md5** or **sha**. If **md5** or **sha** are specified, the user login password will be used as the snmpv3 authentication password. The <username> is the login user name for which the specified authentication protocol will be used.

Syntax

```
username snmpv3 authentication <username> {none | md5 | sha}
no username snmpv3 authentication <username>
```

<username> - is the login user name.

md5 - md5 authentication method.

sha - sha authentication method.

none - no use authentication method.

no - This command sets the authentication protocol to be used for the specified login user to **none**. The <username> is the login user name for which the specified authentication protocol will be used.

Default Setting

No authentication

Command Mode

Global Config

9.9.2.3 username snmpv3 encryption

This command specifies the encryption protocol and key to be used for the specified login user. The valid encryption protocols are **none** or **des**. The **des** protocol requires a **key**, which can be specified on the command line. The **key** may be up to 16 characters. If the **des** protocol is specified but a key is not provided, the user will be prompted to enter the key. If **none** is specified, a key must not be provided. The <username> is the login user name for which the specified encryption protocol will be used.

Syntax

```
username snmpv3 encryption <username> {none | des <0|7> <key>}
no username snmpv3 encryption <username>
```

<username> - is the login user name.

des - des encryption protocol.

none - no encryption protocol.

no - This command sets the encryption protocol to **none**. The <username> is the login user name for which the specified encryption protocol will be used.

Default Setting

No encryption

Command Mode

Global Config

9.9.2.4 username defaultlogin

This command assigns the authorization login list to use for non-configured users when attempting to log in to the system. This setting is overridden by the authorization login list assigned to a specific user if the user is configured locally. If this value is not configured, users will be authorizated using local authorization only.

Syntax

```
username defaultlogin <listname>
```

<listname> - an authentication login list.

Default Setting

None

Command Mode

Global Config

9.9.2.5 username login

This command assigns the specified authorization login list to the specified user for system login. The **<username>** must be a configured **<username>** and the **<listname>** must be a configured login list.

If the user is assigned a login list that requires remote authorization, all access to the interface from all CLI, Web, and telnet sessions will be blocked until the authorization is complete.

Note that the login list associated with the 'admin' user cannot be changed to prevent accidental lockout from the switch.

Syntax

username login <user> <listname>

<user> - is the login user name.

<listname> - an authorization login list.

Default Setting

No authentication

Command Mode

Global Config

9.9.2.6 password minimum length

The user can go to the CLI Global Configuration Mode to set the minimum password length.

Syntax

password min-length <1-64>

no - This command sets the minimum password length to default value.

Default Setting

8

Command Mode

Global Config

9.10 Privilege Level Command

By default, the command-line interface (CLI) has two levels of access to commands: user EXEC mode (level 1) and privileged EXEC mode (level 15). However, you can configure additional levels of access to commands, called privilege levels, to meet the needs of your users while protecting the system from unauthorized access. Up to 16 privilege levels can be configured, from level 0, which is the most restricted level, to level 15, which is the least restricted level.

Access to each privilege level is enabled through separate passwords, which you specify when configuring the privilege level.

For example, if you want a certain set of users to be able to configure only sntp option, but not allow them access to other configuration options, you could create a separate privilege level for only specific sntp configuration commands and distribute the password for that level to those users. These commands are used to control CLI.

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9.10.1 Show commands

9.10.1.1 show privilege-level

This command displays current session's privilege level.

Syntax
show privilege-level

Default Setting

None

Command Mode

User Exec

Display Message

Current Privilege levels: current session's privilege level.

9.10.2 Configuration Commands

Each command in a privilege level had to be specified with a separate privilege command. This feature introduces a “wildcard” option that allows you to configure access to multiple commands with only one privilege command. By using the all keyword, you can specify a privilege level for all commands which begin with the string you enter. In other words, the all keyword allows you to grant access to all command-line options and suboptions for a specified command.

9.10.2.1 Privilege

This command configure a new privilege level for users and associate commands with that privilege level

Syntax

privilege *mode* [all] {level <0-15> | reset} {*[command1] [command2] [command3] [command4] [command5]*}

mode	Configuration mode for the specified command.
all	(Optional) Changes the privilege level for all the suboptions to the same level.
level *level*	Specifies the privilege level you are configuring for the specified command or commands. The level argument must be a number from 0 to 15.
reset	Resets the privilege level of the specified command or commands to the default and removes the privilege level configuration from the running configuration file.
command	Command associated with the specified privilege level. If the all keyword is used, specifies the command and subcommands associated with the privilege level. Note: you can insert commands up to five words and the sum of total words length must be less than 128 characters.

Default Setting

None

Command Mode

Global Config

9.10.2.2 enable secret

This command allow user to set specified privilege level password.

Syntax

```
enable secrect level <1-15> {0|7} <password>
no enable secrect level <1-15>
```

no – This command sets the specified privilege level password to none.

Default Setting

None

Command Mode

Global Config

9.10.2.3 enable

This command allow user to access specified privilege level.

Syntax

```
enable [<0-15>]
```

Note - If user want to access higher privilege level, it need to authentic specified password.

Default Setting

15

Command Mode

User Exec

9.10.2.4 disable

This command allow user to access specified privilege level

Syntax

disable [<0-15>]

Note – This command only allow user to access lower privilege level then current privilege level.

Default Setting

15

Command Mode

User Exec

9.11 Uplink Set Commands

9.11.1 Show Commands

This command display the Uplink Set information.

Syntax

show uplink-set [<uplinkSetName>]

<uplinkSetName> - The name of uplink set which user want to display.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Uplink Set Name: This indicates the name of uplink set.

Logical Interface: Logical interface of this Pplink Set for Active Ports and Backup Ports.

External Ports: The member of the uplink set. The member should be the external ports.

External Active Ports: List the external active port members

External Backup Ports: List the external backup port members

Link State: The status of linkstate for the uplink set.

Port Backup: The status of port backup for the uplink set.

IGMP snooping: The status of the IGMP snooping for the uplink set.

LACP: The status of the LACP for the uplink set.

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9.11.2 Configuration Commands

This command is used to create or delete an uplink set and also used to enable or disable the MAC move update feature for a uplink set.

Syntax

```
uplink-set <uplinkSetName> [mac-move-update]
no uplink-set <uplinkSetName> [mac-move-update]
```

<uplinkSetName> - A string associated with uplink set as a convenience. It can be up to 32 alphanumeric characters, and can not be blank.

mac-move-update - the MAC address-table move update feature on uplink set.

no - This command deletes an existing uplink set.

Default Setting

None

Command Mode

Global Config

This command is used to add or remove a port to/form a uplink set.

Syntax

```
uplink-set <uplinkSetName>
no uplink-set <uplinkSetName>
```

<uplinkSetName> - A string associated with uplink set as a convenience. It can be up to 32 alphanumeric characters, and can not be blank.

no - This command removes a port from a uplink set.

Default Setting

None

Command Mode

Interface Config

9.12 Port Group Commands

9.12.1 Show Commands

This command display the port group information.

Syntax
show port-group [<portGroupName>]

<portGroupName> - The name of a port group which user want to display.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Port Group Name: This indicates the name of port group.

Internal Ports: List the internal port members

Uplink Set Name: The name of the uplink set.

External Ports: List the external ports of the port group.

9.12.2 Configuration Commands

This command is used to create or delete an port group.

Syntax

port-group <portGroupName> [<uplinkSetName>]
no port-group <portGroupName> [<uplinkSetName>]

<uplinkSetName> - A string associated with uplink set as a convenience. It should be an existing uplink set.

<portGroupName> - A string associated with port group as a convenience. It can be up to 32 alphanumeric characters, and can not be blank.

no - This command deletes an existing port group.

Default Setting

None

Command Mode

Global Config

This command is used to rename an port group.

Syntax

port-group rename <old-groupname> <new-groupname>

<old-groupnamee> - the current name in port-group.

<new-groupname> - the new name that will be used.

Default Setting

None

Command Mode

Global Config

This command is used to add or remove a port to/form a port group.

Syntax

```
port-group <portGroupName>
no port-group <portGroupName>
```

<portGroupName> - A string associated with port group as a convenience. It should be an existing port group.

no - This command removes a port from a port group.

Default Setting

None

Command Mode

Interface Config

9.13 VLAN Port Group Commands

9.13.1 Show Commands

This command display the VLAN group information.

Syntax

show vlan-group [<vlanGroupName>]

<vlanGroupName> - The name of a VLAN group which user want to display.

Default Setting

None

Command Mode

Privileged Exec

Display Message

VLAN port group name: This indicates the name of VLAN group

VLAN ID: The VLAN Identifier of the VLAN group. The range of the VLAN ID is from 1 to 4094

Internal Ports: Internal interface, member of that VLAN group.

Uplink Set Name: Specified Uplink Set for the external connection

External Ports: External interface, member of the specified Uplink Set.

Native VLAN: Native VLAN feature is support on this VLAN group or not

9.13.2 Configuration Commands

This command is used to create or destroy a VLAN group.

Syntax

```
vlan-group <vlanGroupName> <1-4094> <uplinkSetName>
no vlan-group <vlanGroupName>
```

<vlanGroupName> - A string associated with VLAN group as a convenience.

<1-4094> - VLAN ID

<uplinkSetName> - which uplink set to be the external connection for this VLAN group.

no - This command disables linkstate for an existing VLAN group.

The range of VLAN ID is 1 to 4093 for the stackable connection blade.

Default Setting

None

Command Mode

Global Config

This command is used to rename a VLAN group.

Syntax

```
vlan-group rename <old-groupname> <new-groupname>
```

<old-groupname> - current group-name in vlan-group.

<new-groupname> - the new group name that will be used.

Default Setting

None

Command Mode

Global Config

This command is used to add/remove a port to/from VLAN group.

Syntax

```
vlan-group <vlanGroupName> [<tagged>]
no vlan-group <vlanGroupName>
```

<vlanGroupName> - A string associated with VLAN group as a convenience.

<tagged> - Assigned a tagged VLAN group for a port. The tagged packets received on the port will be sent to corresponding uplink ports as VLAN tagged packets.

no - This command removes a port from the specified VLAN group.

Default Setting

None

Command Mode

Interface Config

This command is used to set the native VLAN option for a specific VLAN group.

Syntax

```
vlan-group-nativeVLAN <vlanGroupName>
no vlan-group-nativeVLAN <vlanGroupName>
```

<vlanGroupName> - A string associated with VLAN group as a convenience.

no - This command sets the native VLAN option back to default value..

Default Setting

Disable

Command Mode

Global Config

9.14 Service LAN Commands

9.14.1 Show Commands

This command display the Service LAN information.

Syntax

show svc-lan [<svcLanName>]

<svcLanName> - The name of Service LAN which user want to display.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Service LAN name: This indicates the name of Service LAN

VLAN ID: The VLAN Identifier of the Service LAN. The range of the VLAN ID is from 1 to 4094

Internal Ports: Internal interface, member of that Service LAN.

Uplink Set Name: Specified the Uplink Set for the external connection.

External Ports: External interface, member of the specified Uplink Set.

9.14.2 Configuration Commands

This command is used to create or destroy a Service LAN.

Syntax

```
svc-lan <svcLanName> <1-4094> <uplinkSetName>
no svc-lan <svcLanName>
```

<svcLanName> - A string associated with Service LAN as a convenience.

<1-4094> - VLAN ID

<uplinkSetName> - which uplink set to be the external connection for this service LAN.

no - This command destroies the specified Service LAN.

Default Setting

None

Command Mode

Global Config

This command is used to add/remove a port to/from Service LAN.

Syntax

```
svc-lan <svcLanName>
no svc-lan <svcLanName>
```

<svcLanName> - A string associated with Service LAN as a convenience.

no - This command removes a port from the specified Service LAN.

Default Setting

None

Command Mode

Interface Config

9.15 Service VLAN Commands

9.15.1 Show Commands

This command display the Service VLAN information.

Syntax

show svc-vlan [<svcVlanName>]

<svcVlanName> - The name of Service VLAN which user want to display.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Service VLAN name: This indicates the name of Service VLAN

VLAN ID: The VLAN Identifier of the Service VLAN. The range of the VLAN ID is from 1 to 4094.

Internal Ports: Internal interface, member of that Service VLAN.

Uplink Set Name: Specified the Uplink Set for the external connection.

External Ports: External interface, member of the specified Uplink Set.

9.15.2 Configuration Commands

This command is used to create or destroy a Service VLAN.

Syntax

```
svc-vlan <svcVlanName> <1-4094> <uplinkSetName>
no svc-vlan <svcVlanName>
```

<svcVlanName> - A string associated with Service VLAN as a convenience.

<1-4094> - VLAN ID

<uplinkSetName> - which uplink set to be the external connection for this service VLAN.

no - This command destroies the existing Service VLAN.

Default Setting

None

Command Mode

Global Config

This command is used to add/remove a port to/from Service VLAN.

Syntax

```
svc-vlan <svcVlanName>
no svc-vlan <svcVlanName>
```

<svcVlanName> - A string associated with Service VLAN as a convenience.

no - This command removes a port from the specified Service VLAN.

Default Setting

None

Command Mode

Interface Config

9.16 Isolation Commands

9.16.1 Configuration Commands

This command is used to enable or disable isolation mode for an interface. In general, the communication between all interfaces in the same port group is possible. You could make an interface invisible for other member of this port group, and the packets received on this interface will not be forwarded to the other member of this port group, but the uplink ports.

Syntax

```
isolation
no isolation
```

no –This command disables isolation mode in this interface.

Default Setting

None

Command Mode

Interface Config

9.17 Lock Commands

9.17.1 lock

This command locks the http access to the IBP and registers the passed “lock_identifier” with this lock. When the lock is set, the Web-GUI presents a message that access to this IBP is currently not possible, because it is managed by another application. Use the no form to restore to default value.

Syntax

```
lock <lock_identifier> [EXCLUSIVE]
no lock {<lock_identifier>|ALL}
```

< lock_identifier > - A alphanumeric string. (Range: 1-32 characters).

no - This command is used to restore to default value.

Default Setting

None

Command Mode

Global Config

9.17.2 lock_message

This command allows specification of the displayed message in the Web-GUI of IBP when a lock is set. It must be possible to specify any HTML string. Use “lock_message default” to restore default value.

Syntax

lock_message {<message_string>| default}

< message_string > - A specify HTML string. (Range: 1-512 characters).

lock_message default - This command is used to restore to default value.

Default Setting

< message_string > : “This intelligent Blade Panel is currently managed by a Virtual IO Manager. Therefore it is not possible to configure this module by the HTTP user interface. If you want to remove this lock, this Blade server must not be managed by any Virtual IO Manager. In order to release the lock without using the Virtual IO Manager issue the command "no lock <lock_identifier>" for each lock identifier that is registered.”

Command Mode

Global Config

9.17.3 lock_reset

This command resets the IBP to unlock status, and restore all lock configuration.

Syntax

lock_reset

Default Setting

None

Command Mode

Global Config

9.17.4 show lock

This command displays the information which contented the lock status and the list of lock identifiers that are registered. And displays the current lock message.

Syntax
show lock

Default Setting

None

Command Mode

Privileged Exec

Display Message

Lock Status: This field indicates the current lock status.

Lock Message: This field displays the message in the Web-GUI of the IBP when a lock is set.

Identifier: This field specifies the registered “lock_identifier” with this lock.

State: The state may have the values of None, Normal, or Exclusive.

9.18 Port Backup

Two link aggregation groups are associated with one port group as the port group is created. Two link aggregation groups are defined as active and backup port internally. One of two link aggregation groups will be activated at a time. For example, as active link aggregation group is link up, the backup aggregation group will be blocked (no traffic could be sent or received). Otherwise, if active aggregation group is link down (all members of the active aggregation group are link down), the backup aggregation group will be activated. As the active aggregation group is link up again, the backup aggregation group will be deactivated.

9.18.1 Show Commands

This command display the port backup information.

Syntax

show port-backup [<uplinkSetName> [status] | status]

<uplinkSetName> - The name of a uplink set which user want to display.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Uplink Set Name: This indicates the name of uplink set.

Port Backup: This indicates port-backup is enabled or disabled.

External Active Ports: This indicates which ports are in active-port list.

External Backup Ports: This indicates which ports are in backup-port list.

Failback time: This indicates that is failback time.

Current activated port: This indicates which activated port is Active or Backup.

9.18.2 Configuration Commands

This command is used to enable or disable port backup for a uplink set.

Syntax

```
port-backup <uplinkSetName>
no port-backup <uplinkSetName>
```

<uplinkSetName> - A string associated with uplink set as a convenience. It should be an existing uplink set.

no - This command disables port backup for an existing port group.

Default Setting

None

Command Mode

Global Config

This command is used to set the failback time of port backup for a uplink set.

Syntax

```
port-backup <uplinkSetName> failback-time <value>
no port-backup <uplinkSetName> failback-time
```

<uplinkSetName> - A string associated with uplink set a convenience. It should be an existing uplink set.

<value> - The 0 indicate disable failback time. Time value is range from 1 to 60 seconds. Default value is 60 seconds.

no - This command sets the failback time to default value for the specific uplink set.

Default Setting

60

Command Mode

Global Config

This command is used to move a port from active-port list to backup-port list.

Syntax

```
port-backup
no port-backup
```

no - This command moves the port to active-port list.

Restriction: users are not allowed to move the last member of active port to backup port.

Default Setting

None

Command Mode

Interface Config

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9.19 Link State Commands

The purpose of this feature is to allow the connection blade to disable the server-blade ports when all of its uplink ports are inactive. It could improve the switching time and realize the “rapid” failover of redundant LAN ports of server blades. This section will describe how to configure the link state for an uplink set.

9.19.1 Show Commands

This command display the linkstate information.

Syntax
show linkstate [<uplinkSetName>]

<uplinkSetName> - The name of a uplink set which user want to display.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Uplink Set Name: This indicates the name of uplink set

Linkstate:. This indicates linkstate is enabled or disabled for this uplink set.

9.19.2 Configuration Commands

This command is used to enable or disable linkstate for a uplink set

Syntax

```
linkstate <uplinkSetName>
no linkstate <uplinkSetName>
```

<uplinkSetName> - A string associated with uplink set as a convenience. It should be an existing uplink set.

no - This command disables linkstate for an existing uplink set.

Default Setting

None

Command Mode

Global Config

9.20 SNTP Commands

9.20.1 Show Commands

9.20.1.1 show sntp

This command displays the current time and configuration settings for the SNTP client, and indicates whether the local time has been properly updated.

Syntax

show sntp

Default Setting

None

Command Mode

User Exec, Privileged Exec

Display Message

Last Update Time: The time of last clock update.

Last Unicast Attempt Time: The time of last transmit query (in unicast mode).

Last Attempt Status: The status of the last SNTP request (in unicast mode) or unsolicited message (in broadcast mode).

Broadcast Count: Current number of unsolicited broadcast messages that have been received and processed by the SNTP client since last reboot.

Time Zone: Time zone configured.

9.20.1.2 show sntp client

This command displays SNTP client settings.

Syntax
show sntp client

Default Setting

None

Command Mode

Privileged Exec

Display Message

Client Supported Modes: Supported SNTP Modes (Broadcast, Unicast, or Multicast).

SNTP Version: The highest SNTP version the client supports.

Port : SNTP Client Port

Client Mode: Configured SNTP Client Mode.

Unicast Poll Interval: Poll interval value for SNTP clients in seconds as a power of two.

Poll Timeout (Seconds): Poll timeout value in seconds for SNTP clients.

Poll Retry: Poll retry value for SNTP clients.

9.20.1.3 show sntp server

This command displays configured SNTP servers and SNTP server settings.

Syntax
show sntp server

Default Setting

None

Command Mode

Privileged Exec

Display Message

Server IP Address: IP address of configured SNTP Server

Server Type: Address Type of Server.

Server Stratum: Claimed stratum of the server for the last received valid packet.

Server Reference ID: Reference clock identifier of the server for the last received valid packet.

Server Mode: SNTP Server mode.

Server Max Entries: Total number of SNTP Servers allowed.

Server Current Entries: Total number of SNTP configured.

For each configured server:

IP Address: IP address of configured SNTP Server.

Address Type: Address Type of configured SNTP server.

Priority: IP priority type of the configured server.

Version: SNTP Version number of the server. The protocol version used to query the server in unicast mode.

Port: Server Port Number

Last Attempt Time: Last server attempt time for the specified server.

Last Update Status: Last server attempt status for the server.

Total Unicast Requests: Number of requests to the server.

Failed Unicast Requests: Number of failed requests from server.

9.20.2 Configuration Commands

9.20.2.1 sntp broadcast client poll-interval

This command will set the poll interval for SNTP broadcast clients in seconds as a power of two where <poll-interval> can be a value from 6 to 16.

Syntax

sntp broadcast client poll-interval <poll-interval>
no sntp broadcast client poll-interval

<poll-interval> - The range is 6 to 16.

no - This command will reset the poll interval for SNTP broadcast client back to its default value.

Default Setting

The default value is 6.

Command Mode

Global Config

9.20.2.2 sntp client mode

This command will enable Simple Network Time Protocol (SNTP) client mode and optionally setting the mode to either broadcast, multicast, or unicast.

Syntax

```
sntp client mode [broadcast | unicast | multicast]
no sntp client mode
```

no - This command will disable Simple Network Time Protocol (SNTP) client mode.

The SNTP IPv4 multicast address is 224.0.1.1.

The SNTP IPv6 multicast address is ff05::101.

IPv6 address doesn't support broadcast mode.

Default Setting

None

Command Mode

Global Config

9.20.2.3 sntp client port

This command will set the SNTP client port id and polling interval in seconds.

Syntax

```
sntp client port <portid>
no sntp client port
```

<portid> - SNTP client port id, 1 - 65536.

Default Setting

The default port id is 123.

Command Mode

Global Config

9.20.2.4 sntp unicast client poll-interval

This command will set the poll interval for SNTP unicast clients in seconds.

Syntax

```
sntp unicast client poll-interval <poll-interval>
no sntp unicast client poll-interval
```

<poll-interval> - Polling interval. It's 2^(value) seconds where value is 6 to 10.

no - This command will reset the poll interval for SNTP unicast clients to its default value.

Default Setting

The default value is 6.

Command Mode

Global Config

9.20.2.5 sntp unicast client poll-timeout

This command will set the poll timeout for SNTP unicast clients in seconds.

Syntax

```
sntp unicast client poll-timeout <poll-timeout>
no sntp unicast client poll-timeout
```

< poll-timeout > - Polling timeout in seconds. The range is 1 to 30.

no - This command will reset the poll timeout for SNTP unicast clients to its default value.

Default Setting

The default value is 5.

Command Mode

Global Config

9.20.2.6 sntp unicast client poll-retry

This command will set the poll retry for SNTP unicast clients in seconds.

Syntax

```
sntp unicast client poll-retry <poll-retry>
no sntp unicast client poll-retry
```

< poll-retry> - Polling retry in seconds. The range is 0 to 10.

no - This command will reset the poll retry for SNTP unicast clients to its default value.

Default Setting

The default value is 1.

Command Mode

Global Config

9.20.2.7 sntp server

This command configures an SNTP server (with a maximum of three) where the server address can be an ip address or a domain name and the address type either IPv4, IPv6 or DNS. The optional priority can be a value of 1-3, the version is a value of 1-4, and the port id is a value of 1-65535.

Syntax

```
sntp server <ipaddress/ipv6address/domain-name> <addresstype> [<1-3> [<version> [<portid>]]]
no sntp server remove <ipaddress/ipv6address/domain-name>
```

<ipaddress/ipv6address/domain-name> - IP address of the SNTP server.

<addresstype> - The address type is ipv4, ipv6 or dns.

<1-3> - The range is 1 to 3.

<version> - The range is 1 to 4.

<portid> - The range is 1 to 65535.

no - This command deletes an server from the configured SNTP servers.

Default Setting

None.

Command Mode

Global Config

9.20.2.8 sntp clock timezone

This command sets the time zone for the IBP's internal clock.

Syntax

sntp clock timezone <name> <0-12> <0-59> {before-utc | after-utc}

<name> - Name of the time zone, usually an acronym. (Range: 1-15 characters)

<0-12> - Number of hours before/after UTC. (Range: 0-12 hours)

<0-59> - Number of minutes before/after UTC. (Range: 0-59 minutes)

before-utc - Sets the local time zone before (east) of UTC.

after-utc - Sets the local time zone after (west) of UTC.

Default Setting

Taipei 08:00 After UTC

Command Mode

Global Config

9.20.2.9 sntp multicast client poll-internal

This command will set the poll interval for SNTP multicast clients in seconds.

Syntax

```
sntp multicast client poll-interval <poll-interval>
no sntp multicast client poll-interval
```

<poll-interval> - Polling interval. It's 2^(value) seconds where the range of value is 6 to 10.

no – This command will reset the poll interval for SNTP multicast client to its default value.

Default Setting

The default value is 6.

Command Mode

Global Config

9.21 Security Commands

9.21.1 Show Commands

9.21.1.1 show users authentication

This command displays all users and all authentication login information. It also displays the authentication login list assigned to the default user.

Syntax

show users authentication

Default Setting

None

Command Mode

Privileged Exec

Display Message

User: This field lists every user that has an authentication login list assigne.

System Login: This field displays the authentication login list assigned to the user for system login.

802.1x: This field displays the authentication login list assigned to the user for 802.1x port security.

9.21.1.2 show authentication

This command displays the ordered authentication methods for all authentication login lists.

Syntax

show authentication

Default Setting

None

Command Mode

Privileged Exec

Display Message

Authentication Login List: This displays the authentication login listname.

Method 1: This displays the first method in the specified authentication login list, if any.

Method 2: This displays the second method in the specified authentication login list, if any.

Method 3: This displays the third method in the specified authentication login list, if any.

9.21.1.3 show authentication users

This command displays information about the users assigned to the specified authentication login list. If the login is assigned to non-configured users, the user “default” will appear in the user column.

Syntax

show authentication users <listname>

<listname> - the authentication login listname.

Default Setting

None

Command Mode

Privileged Exec

Display Message

User Name: This field displays the user assigned to the specified authentication login list.

Component: This field displays the component (User or 802.1x) for which the authentication login list is assigned.

9.21.1.4 show dot1x

This command is used to show the status of the dot1x Administrative mode.

Syntax

show dot1x

Default Setting

None

Command Mode

Privileged Exec

Display Message

Administrative mode: Indicates whether authentication control on the IBP is enabled or disabled.

9.21.1.5 show dot1x detail

This command is used to show a summary of the global dot1x configuration and the detailed dot1x configuration for a specified port.

Syntax

show dot1x detail <slot/port>

<slot/port> - is the desired interface number.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Port: The interface whose configuration is displayed

Protocol Version: The protocol version associated with this port. The only possible value is 1, corresponding to the first version of the dot1x specification.

PAE Capabilities: The port access entity (PAE) functionality of this port. Possible values are Authenticator or Supplicant.

Authenticator PAE State: Current state of the authenticator PAE state machine. Possible values are Initialize, Disconnected, Connecting, Authenticating, Authenticated, Aborting, Held, ForceAuthorized, and ForceUnauthorized.

Backend Authentication State: Current state of the backend authentication state machine. Possible values are Request, Response, Success, Fail, Timeout, Idle, and Initialize.

Quiet Period: The timer used by the authenticator state machine on this port to define periods of time in which it will not attempt to acquire a supplicant. The value is expressed in seconds and will be in the range of 0 to 65535.

Transmit Period: The timer used by the authenticator state machine on the specified port to determine when to send an EAPOL EAP Request/Identity frame to the supplicant. The value is expressed in seconds and will be in the range of 1 to 65535.

Supplicant Timeout: The timer used by the authenticator state machine on this port to timeout the supplicant. The value is expressed in seconds and will be in the range of 1 to 65535.

Server Timeout: The timer used by the authenticator on this port to timeout the authentication server. The value is expressed in seconds and will be in the range of 1 to 65535.

Maximum Requests: The maximum number of times the authenticator state machine on this port will retransmit an EAPOL EAP Request/Identity before timing out the supplicant. The value will be in the range of 1 to 10.

Reauthentication Period: The timer used by the authenticator state machine on this port to determine when reauthentication of the supplicant takes place. The value is expressed in seconds and will be in the range of 1 to 65535.

Reauthentication Enabled: Indicates if reauthentication is enabled on this port. Possible values are True or False.

Key Transmission Enabled: Indicates if the key is transmitted to the supplicant for the specified port. Possible values are True or False.

Control Direction: Indicates the control direction for the specified port or ports. Possible values are both or in.

9.21.1.6 show dot1x statistics

This command is used to show a summary of the global dot1x configuration and the dot1x statistics for a specified port.

Syntax
show dot1x statistics <slot/port>

<slot/port> - is the desired interface number.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Port: The interface whose statistics are displayed.

EAPOL Frames Received: The number of valid EAPOL frames of any type that have been received by this authenticator.

EAPOL Frames Transmitted: The number of EAPOL frames of any type that have been transmitted by this authenticator.

EAPOL Start Frames Received: The number of EAPOL start frames that have been received by this authenticator.

EAPOL Logoff Frames Received: The number of EAPOL logoff frames that have been received by this authenticator.

Last EAPOL Frame Version: The protocol version number carried in the most recently received EAPOL frame.

Last EAPOL Frame Source: The source MAC address carried in the most recently received EAPOL frame.

EAP Response/Id Frames Received: The number of EAP response/identity frames that have been received by this authenticator.

EAP Response Frames Received: The number of valid EAP response frames (other than resp/id frames) that have been received by this authenticator.

EAP Request/Id Frames Transmitted: The number of EAP request/identity frames that have been transmitted by this authenticator.

EAP Request Frames Transmitted: The number of EAP request frames (other than request/identity frames) that have been transmitted by this authenticator.

Invalid EAPOL Frames Received: The number of EAPOL frames that have been received by this authenticator in which the frame type is not recognized.

EAP Length Error Frames Received: The number of EAPOL frames that have been received by this authenticator in which the frame type is not recognized.

9.21.1.7 show dot1x summary

This command is used to show a summary of the global dot1x configuration and summary information of the dot1x configuration for a specified port or all ports.

Syntax

show dot1x summary {<slot/port> | all}

<slot/port> - is the desired interface number.

all - All interfaces.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Interface: The interface whose configuration is displayed.

Control Mode: The configured control mode for this port. Possible values are force-unauthorized / force-authorized / auto.

Operating Control Mode: The control mode under which this port is operating. Possible values are authorized / unauthorized.

Reauthentication Enabled: Indicates whether re-authentication is enabled on this port.

Port Status: Indicates if the key is transmitted to the supplicant for the specified port.

9.21.1.8 show dot1x users

This command displays 802.1x port security user information for locally configured users.

Syntax

show dot1x users <slot/port>

<slot/port> - is the desired interface number.

Default Setting

None

Command Mode

Privileged Exec

Display Message

User: Users configured locally to have access to the specified port.

9.21.1.9 show radius-servers

This command is used to display items of the configured RADIUS servers.

Syntax

show radius-servers

Default Setting

None

Command Mode

Privileged Exec

Display Message

Host Address: IPv4/IPv6 Address of the configured RADIUS server

Port: The port in use by this server

Type: Primary or secondary

Secret Configured: Yes / No

Message Authenticator: The message authenticator attribute configured for the radius server.

9.21.1.10 show radius

This command is used to display the various RADIUS configuration items for the IBP.

Syntax

show radius

Default Setting

None

Command Mode

Privileged Exec

Display Message

Current Server Host Address: Indicates the configured server currently in use for authentication

Number of configured servers: The configured IPv4/IPv6 address of the authentication server

Number of retransmits: The configured value of the maximum number of times a request packet is retransmitted

Timeout Duration: The configured timeout value, in seconds, for request re-transmissions

RADIUS Accounting Mode: Disable or Enabled

RADIUS Dead Time: The configured restore time when RADIUS server is down.

RADIUS Attribute 4 Mode: Disable or Enable RADIUS NAS-IP attribute.

RADIUS Attribute 4 Value: RADIUS NAS-IP value.

RADIUS Attribute 95 Mode: Disable or Enable RADIUS NAS-IPv6 attribute.

RADIUS Attribute 95 Value: RADIUS NAS-IPv6 value.

9.21.1.11 show radius accounting

This command is used to display the configured RADIUS accounting mode, accounting server, and the statistics for the configured accounting server.

Syntax
show radius accounting [statistics <ipAddr |ipv6Addr|name>]

<ipAddr |ipv6Addr|name> - is an IPv4/IPv6 Address or Host Name.

Default Setting

None

Command Mode

Privileged Exec

Display Message

If the optional token 'statistics <ipAddr |ipv6Addr|name>' is not included, then only the accounting mode and the RADIUS accounting server details are displayed.

RADIUS Accounting Mode: Enabled or disabled

Host Address: The configured value of the RADIUS accounting server

Port: The port in use by the RADIUS accounting server

Secret Configured: Yes or No

If the optional token 'statistics <ipAddr |ipv6Addr|name>' is included, the statistics for the configured RADIUS accounting server are displayed. The IPv4/IPv6 address or Hostname parameter must match that of a previously configured RADIUS accounting server. The following information regarding the statistics of the RADIUS accounting server is displayed.

RADIUS Accounting Server Host Address: Host Address value of the configured RADIUS accounting server

Round Trip Time: The time interval in centiseconds, between the most recent Accounting- Response and the Accounting-Request that matched it from the RADIUS accounting server.

Requests: The number of RADIUS Accounting-Request packets sent to this accounting server. This number does not include retransmissions.

Retransmission: The number of RADIUS Accounting-Request packets retransmitted to this RADIUS accounting server.

Responses: The number of RADIUS packets received on the accounting port from this server.

Malformed Responses: The number of malformed RADIUS Accounting-Response packets received from this server. Malformed packets include packets with an invalid length. Bad authenticators and unknown types are not included as malformed accounting responses.

Bad Authenticators: The number of RADIUS Accounting-Response packets containing invalid authenticators received from this accounting server.

Pending Requests: The number of RADIUS Accounting-Request packets sent to this server that have not yet timed out or received a response.

Timeouts: The number of accounting timeouts to this server.

Unknown Types: The number of RADIUS packets of unknown types, which were received from this server on the accounting port.

Packets Dropped: The number of RADIUS packets received from this server on the accounting port and dropped for some other reason.

9.21.1.12 show radius statistics

This command is used to display the statistics for RADIUS or configured server. To show the configured RADIUS server statistic, the IPv4/IPv6 Address or Hostname specified must match that of a previously configured RADIUS server. On execution, the following fields are displayed.

Syntax
show radius statistics <ipAddr |ipv6Addr|name>

<ipAddr |ipv6Addr|name> - is an IPv4/IPv6 Address or Host Name.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Server Host Address: The IPv4/IPv6 address or Hostname of radius server.

Round Trip Time: The time interval, in hundredths of a second, between the most recent Access-Reply/ Access-Challenge and the Access-Request that matched it from the RADIUS authentication server.

Access Requests: The number of RADIUS Access-Request packets sent to this server. This number does not include retransmissions.

Access Retransmission: The number of RADIUS Access-Request packets retransmitted to this RADIUS authentication server.

Access Accepts: The number of RADIUS Access-Accept packets, including both valid and invalid packets, which were received from this server.

Access Rejects: The number of RADIUS Access-Reject packets, including both valid and invalid packets, which were received from this server.

Access Challenges: The number of RADIUS Access-Challenge packets, including both valid and invalid packets, which were received from this server.

Malformed Access Responses: The number of malformed RADIUS Access-Response packets received from this server. Malformed packets include packets with an invalid length. Bad authenticators or signature attributes or unknown types are not included as malformed access responses.

Bad Authenticators: The number of RADIUS Access-Response packets containing invalid authenticators or signature attributes received from this server.

Pending Requests: The number of RADIUS Access-Request packets destined for this server that have not yet timed out or received a response.

Timeouts: The number of authentication timeouts to this server.

Unknown Types: The number of RADIUS packets of unknown types, which were received from this server on the authentication port.

Packets Dropped: The number of RADIUS packets received from this server on the authentication port and dropped for some other reason.

9.21.1.13 show tacacs

This command display configured information of the TACACS.

Syntax
show tacacs

Default Setting

None

Command Mode

Privileged Exec

Display Message

Global Timeout: Display the global timeout value of TACACS for all servers.

IP address: TACACS server

Port: TACACS packet port number

Timeout (sec): Timeout value in seconds while TACACS server has no response

Priority: The server priority (0 is the highest priority).

9.21.1.14 show port-security

This command shows the port-security settings for the entire system.

Syntax
show port-security

Default Setting

None

Command Mode

Privileged Exec

Display Message

Port Security Administration Mode: Port lock mode for the entire system.

This command shows the port-security settings for a particular interface or all interfaces.

Syntax
show port-security { <slot/port> | all }

Default Setting

None

Command Mode

Privileged Exec

Display Message

Intf: Interface Number.

Admin Mode: Port Locking mode for the Interface.

Dynamic Limit: Maximum dynamically allocated MAC Addresses.

Static Limit: Maximum statically allocated MAC Addresses.

Violation Trap Mode: Whether violation traps are enabled.

Violation Shutdown: Whether violation shutdown are enabled.

This command shows the dynamically locked MAC addresses for port.

Syntax

show port-security dynamic <slot/port>

Default Setting

None

Command Mode

Privileged Exec

Display Message

MAC address: Dynamically locked MAC address.

This command shows the statically locked MAC addresses for port.

Syntax

show port-security static <slot/port>

Default Setting

None

Command Mode

Privileged Exec

Display Message

MAC address: Statically locked MAC address.

This command displays the source MAC address of the last packet that was discarded on a locked port.

Syntax

show port-security violation <slot/port>

Default Setting

None

Command Mode

Privileged Exec

Display Message

MAC address: MAC address of discarded packet on locked ports.

9.21.2 Configuration Commands

9.21.2.1 authentication login

This command creates an authentication login list. The **<listname>** is up to 15 alphanumeric characters and is not case sensitive. Up to 10 authentication login lists can be configured on the IBP. When a list is created, the authentication method “local” is set as the first method.

When the optional parameters “method1”, “method 2”, and/or “method 3” are used, an ordered list of methods are set in the authentication login list. If the authentication login list does not exist, a new authentication login list is first created and then the authentication methods are set in the authentication login list. The maximum number of authentication login methods is three. The possible method values are **local**, **radius**, **reject**, and **tacacs**.

The value of **local** indicates that the user’s locally stored ID and password are used for authentication. The value of **radius** indicates that the user’s ID and password will be authenticated using the RADIUS server. The value of **reject** indicates that the user is never authenticated. The value of **tacacs** indicates that the user’s ID and password will be authenticated using the TACACS.

To authenticate a user, the authentication methods in the user’s login will be attempted in order until an authentication attempt succeeds or fails.

Note that the default login list included with the default configuration cannot be changed.

Syntax

```
authentication login <listname> [<method1>] [<method2>] [<method3>]
no authentication login <listname>
```

<listname> - creates an authentication login list (Range: up to 15 characters).

<method1 - 3> - The possible method values are local, radius, reject, and tacacs.

no - This command deletes the specified authentication login list. The attempt to delete will fail if any of the following conditions are true:

The login list name is invalid or does not match an existing authentication login list

The specified authentication login list is assigned to any user or to the nonconfigured user for any component.

The login list is the default login list included with the default configuration and was not created using ‘config authentication login create’. The default login list cannot be deleted.

Default Setting

None

Command Mode

Global Config

9.21.2.2 username defaultlogin

This command assigns the authentication login list to use for non-configured users when attempting to log in to the system. This setting is overridden by the authentication login list assigned to a specific user if the user is configured locally. If this value is not configured, users will be authenticated using local authentication only.

Syntax

username defaultlogin <listname>

<listname> - an authentication login list.

Default Setting

None

Command Mode

Global Config

9.21.2.3 username login

This command assigns the specified authentication login list to the specified user for system login. The **<username>** must be a configured **<username>** and the **<listname>** must be a configured login list.

If the user is assigned a login list that requires remote authentication, all access to the interface from all CLI, web, and telnet sessions will be blocked until the authentication is complete.

Note that the login list associated with the ‘admin’ user cannot be changed to prevent accidental lockout from the IBP.

Syntax

username login <user> <listname>

<user> - is the login user name.

<listname> - an authentication login list.

Default Setting

None

Command Mode

Global Config

9.21.3 Dot1x Configuration Commands

9.21.3.1 dot1x initialize

This command begins the initialization sequence on the specified port. This command is only valid if the control mode for the specified port is 'auto'. If the control mode is not 'auto' an error will be returned.

Syntax

dot1x initialize <slot/port>

<slot/port> - is the desired interface number.

Default Setting

None

Command Mode

Privileged Exec

9.21.3.2 dot1x default-login

This command assigns the authentication login list to use for non-configured users for 802.1x port security. This setting is over-ridden by the authentication login list assigned to a specific user if the user is configured locally. If this value is not configured, users will be authenticated using local authentication only.

Syntax

dot1x defaultl-login <listname>

<listname> - an authentication login list.

Default Setting

None

Command Mode

Global Config

9.21.3.3 dot1x login

This command assigns the specified authentication login list to the specified user for 802.1x port security. The **<user>** parameter must be a configured user and the **<listname>** parameter must be a configured authentication login list.

Syntax

```
dot1x login <user> <listname>
```

<user> - is the login user name.

<listname> - an authentication login list.

Default Setting

None

Command Mode

Global Config

9.21.3.4 dot1x system-auth-control

This command is used to enable the dot1x authentication support on the IBP. By default, the authentication support is disabled. While disabled, the dot1x configuration is retained and can be changed, but is not activated.

Syntax

```
dot1x system-auth-control
no dot1x system-auth-control
```

no - This command is used to disable the dot1x authentication support on the IBP.

Default Setting

Disabled

Command Mode

Global Config

9.21.3.5 dot1x user

This command adds the specified user to the list of users with access to the specified port or all ports. The <username> parameter must be a configured user.

Syntax

```
dot1x user <user> {<slot/port> | all}
no dot1x user <user> {<slot/port> | all}
```

<user> - Is the login user name.

<slot/port> - Is the desired interface number.

all - All interfaces.

no - This command removes the user from the list of users with access to the specified port or all ports.

Default Setting

None

Command Mode

Global Config

9.21.3.6 dot1x port-control

This command sets the authentication mode to be used on all ports. The control mode may be one of the following.

force-unauthorized: The authenticator PAE unconditionally sets the controlled port to unauthorized.

force-authorized: The authenticator PAE unconditionally sets the controlled port to authorized.

auto: The authenticator PAE sets the controlled port mode to reflect the outcome of the authentication exchanges between the supplicant, authenticator, and the authentication server.

Syntax

```
dot1x port-control all {auto | force-authorized | force-unauthorized}
no dot1x port-control all
```

all - All interfaces.

no - This command sets the authentication mode to be used on all ports to 'auto'.

Default Setting

auto

Command Mode

Global Config

This command sets the authentication mode to be used on the specified port. The control mode may be one of the following.

force-unauthorized: The authenticator PAE unconditionally sets the controlled port to unauthorized.

force-authorized: The authenticator PAE unconditionally sets the controlled port to authorized.

auto: The authenticator PAE sets the controlled port mode to reflect the outcome of the authentication exchanges between the supplicant, authenticator, and the authentication server.

Syntax

```
dot1x port-control {auto | force-authorized | force-unauthorized}
no dot1x port-control
```

no - This command sets the authentication mode to be used on the specified port to 'auto'.

Default Setting

auto

Command Mode

Interface Config

9.21.3.7 dot1x max-req

This command sets the maximum number of times the authenticator state machine on this port will transmit an EAPOL EAP Request/Identity frame before timing out the supplicant. The <1-10> value must be in the range 1 - 10.

Syntax

```
dot1x max-req <1-10>
no dot1x max-req
```

<1-10> - maximum number of times (Range: 1 – 10).

no - This command sets the maximum number of times the authenticator state machine on this port will transmit an EAPOL EAP Request/Identity frame before timing out the supplicant to the default value, that is, 2.

Default Setting

2

Command Mode

Interface Config

9.21.3.8 dot1x re-authentication

This command enables re-authentication of the supplicant for the specified port.

Syntax

```
dot1x re-authentication
no dot1x re-authentication
```

no - This command disables re-authentication of the supplicant for the specified port.

Default Setting

Disabled

Command Mode

Interface Config

9.21.3.9 dot1x re-reauthenticate

This command begins the re-authentication sequence on the specified port. This command is only valid if the control mode for the specified port is 'auto'. If the control mode is not 'auto' an error will be returned.

Syntax

```
dot1x re-authenticate <slot/port>
```

<slot/port> - is the desired interface number.

Default Setting

None

Command Mode

Privileged Exec

9.21.3.10 dot1x timeout

This command sets the value, in seconds, of the timer used by the authenticator state machine on this port. Depending on the token used and the value (in seconds) passed; various timeout configurable parameters are set. The following tokens are supported.

reauth-period: Sets the value, in seconds, of the timer used by the authenticator state machine on this port to determine when re-authentication of the supplicant takes place. The reauth-period must be a value in the range 1 - 65535.

quiet-period: Sets the value, in seconds, of the timer used by the authenticator state machine on this port to define periods of time in which it will not attempt to acquire a supplicant. The quiet-period must be a value in the range 0 - 65535.

tx-period: Sets the value, in seconds, of the timer used by the authenticator state machine on this port to determine when to send an EAPOL EAP Request/Identity frame to the supplicant. The quiet-period must be a value in the range 1 - 65535.

supp-timeout: Sets the value, in seconds, of the timer used by the authenticator state machine on this port to timeout the supplicant. The supp-timeout must be a value in the range 1 - 65535.

server-timeout: Sets the value, in seconds, of the timer used by the authenticator state machine on this port to timeout the authentication server. The supp-timeout must be a value in the range 1 - 65535.

Syntax
dot1x timeout {quiet-period | reauth-period | server-timeout | supp-timeout | tx-period} <seconds> no dot1x timeout {quiet-period | reauth-period | server-timeout | supp-timeout | tx-period}

<seconds> - Value in the range 0 – 65535.

no - This command sets the value, in seconds, of the timer used by the authenticator state machine on this port to the default values. Depending on the token used, the corresponding default values are set.

Default Setting

reauth-period: 3600 seconds

quiet-period: 60 seconds

tx-period: 30 seconds

supp-timeout: 30 seconds

server-timeout: 30 seconds

Command Mode

Interface Config

9.21.4 Radius Configuration Commands

9.21.4.1 radius accounting mode

This command is used to enable the RADIUS accounting function.

Syntax

```
radius accounting mode
no radius accounting mode
```

no - This command is used to set the RADIUS accounting function to the default value - that is, the RADIUS accounting function is disabled.

Default Setting

Disabled

Command Mode

Global Config

9.21.4.2 radius-server host

This command is used to configure the RADIUS authentication and accounting server.

If the **'auth'** token is used, the command configures the IPv4/IPv6 address or Hostname to use to connect to a RADIUS authentication server. Up to 3 servers can be configured per RADIUS client. If the maximum number of configured servers is reached, the command will fail until one of the servers is removed by executing the **no** form of the command. If the optional **<port>** parameter is used, the command will configure the UDP port number to use to connect to the configured RADIUS server. In order to configure the UDP port number, the IP address must match that of a previously configured RADIUS authentication server. The port number must lie between 1 - 65535, with 1812 being the default value.

If the **'acct'** token is used, the command configures the IPv4/IPv6 address or Hostname to use for the RADIUS accounting server. Only a single accounting server can be configured. If an accounting server is currently configured, it must be removed from the configuration using the no form of the command before this command succeeds. If the optional **<port>** parameter is used, the command will configure the UDP port to use to connect to the RADIUS accounting server. The IPv4/IPv6 address or Hostname specified must match that of a previously configured accounting server. If a port is already configured for the accounting server then the new port will replace the previously configured value. The port must be a value in the range 1 - 65535, with 1813 being the default value.

Syntax

```
radius-server host {acct | auth} <ipAddr|ipv6Addr|hostname> [port]
no radius-server host {acct | auth} <ipAddr|ipv6Addr|hostname>
```

<ipAddr|ipv6Addr|hostname> - is a IPv4/IPv6 Address or Host Name.

[port] - Port number (Range: 1 – 65535)

no - This command is used to remove the configured RADIUS authentication server or the RADIUS accounting server. If the 'auth' token is used, the previously configured RADIUS authentication server is removed from the configuration. Similarly, if the 'acct' token is used, the previously configured RADIUS accounting server is removed from the configuration. The <ipAddr|ipv6Addr|hostname> parameter must match the IPv4/IPv6 address or Host name of the previously configured RADIUS authentication / accounting server.

Default Setting

None

Command Mode

Global Config

9.21.4.3 radius-sever key

This command is used to configure the shared secret between the RADIUS client and the RADIUS accounting / authentication server. Depending on whether the **'auth'** or **'acct'** token is used, the shared secret will be configured for the RADIUS authentication or RADIUS accounting server. The IP address provided must match a previously configured server. When this command is executed, the secret will be prompted. The secret must be an alphanumeric value not exceeding 20 characters.

Syntax

radius-server key {acct | auth} <ipAddr|ipv6Addr|hostname> <0|7> <key-value>

<ipAddr|ipv6Addr|hostname> - is a IPv4/IPv6 address or Host Name.

<0|7> - 0 specifies key in plain text and 7 specifies key in excrypted form.

<key-value> - shared secret key.

Default Setting

None

Command Mode

Global Config

9.21.4.4 radius-server retransmit

This command sets the maximum number of times a request packet is re-transmitted when no response is received from the RADIUS server. The retries value is an integer in the range of 1 to 15.

Syntax

radius-server retransmit <retries>
no radius-server retransmit

<retries> - the maximum number of times (Range: 1 - 15).

no - This command sets the maximum number of times a request packet is re-transmitted, when no response is received from the RADIUS server, to the default value, that is, 10.

Default Setting

10

Command Mode

Global Config

9.21.4.5 radius-server timeout

This command sets the timeout value (in seconds) after which a request must be retransmitted to the RADIUS server if no response is received. The timeout value is an integer in the range of 1 to 30.

Syntax

```
radius-server timeout <seconds>
no radius-server timeout
```

<seconds> - the maximum timeout (Range: 1 - 30).

no - This command sets the timeout value (in seconds) after which a request must be retransmitted to the RADIUS server if no response is received, to the default value, that is, 6.

Default Setting

6

Command Mode

Global Config

9.21.4.6 radius-server msgauth

This command enables the message authenticator attribute for a specified server.

Syntax

```
radius-server msgauth <ipAddr|ipv6Addr|hostname>
```

<ipAddr|ipv6Addr|hostname> - is a IPv4/IPv6 address or Host name.

Default Setting

None

Command Mode

Global Config

9.21.4.7 radius-server primary

This command is used to configure the primary RADIUS authentication server for this RADIUS client. The primary server is the one that is used by default for handling RADIUS requests. The remaining configured servers are only used if the primary server cannot be reached. A maximum of three servers can be configured on each client. Only one of these servers can be configured as the primary. If a primary server is already configured prior to this command being executed, the server specified by the IPv4/IPv6 address or Hostname specified used in this command will become the new primary server. The IPv4/IPv6 address or Hostname must match that of a previously configured RADIUS authentication server.

Syntax

radius-server primary <ipAddr|ipv6Addr|hostname>

<ipAddr|ipv6Addr|hostname> - is a IPv4/IPv6 address or Host Name.

Default Setting

None

Command Mode

Global Config

9.21.5 TACACS+ Configuration Commands

9.21.5.1 tacacs host

This command is used to configure the TACACS server.

When this command executes, the Command Mode will change to TACACS mode to configure specified values for the host.

Syntax

```
tacacs host <ipAddr|ipv6Addr|hostname>
no tacacs host <ipAddr|ipv6Addr|hostname>
```

<ipAddr|ipv6Addr|hostname> - is a IPv4/IPv6 address or Host Name.

no - This command is used to remove the configured TACACS server. The <ipAddr|ipv6Addr|hostname> parameter must match the IPv4/IPv6 address or Host name of the previously configured TACACS server.

Default Setting

None

Command Mode

Global Config

This command is used to configure specified authentication and encryption key of the TACACS server.

Syntax

```
key [<0/7> <key-value>]
```

If this command without any parameter, the key value will be removed and use global key

Note that the length of the secret key is up to 32 characters.

<0/7> - 0 specifies key in plain text and 7 specifies key in excrypted form.

<key-value> - TACACS authentication and encrypted key.

Default Setting

None

Command Mode

TACACS mode

This command is used to configure the TACACS server's service port.

Syntax

port [<0-65535>]

If this command without any parameter, the port value will be reset to default value.

<0-65535> - TACACS service port (Range: 0 to 65535).

Default Setting

49

Command Mode

TACACS mode

This command is used to configure the TACACS server's priority.

Syntax

Priority [<0-65535>]

If this command without any parameter, the priority value will be reset to default value.

<0-65535> - TACACS service priority (Range: 0 to 65535).

Default Setting

0

Command Mode

TACACS mode

This command is used to configure specified connection timeout value of TACACS.

Syntax

```
timeout [<seconds>]
```

If this command without any parameter, the timeout value will be removed and use global timeout.

<seconds> - The connection timeout value of TACACS (Range: 1 – 30).

Default Setting

None

Command Mode

TACACS mode

9.21.5.2 tacacs key

This command is used to configure global authentication and encryption key of TACACS server.

Syntax

```
tacacs key <0/7> <key-value>
no tacacs key
```

Note that the length of the secret key is up to 32 characters.

<0/7> - 0 specifies key in plain text and 7 specifies key in excrypted form.

<key-value> - TACACS authentication and encrypted key.

no - This command is used to remove the TACACS server secret key.

Default Setting

None

Command Mode

Global Config

9.21.5.3 tacacs timeout

This command is used to configure global connection timeout value of TACACS.

Syntax

```
tacacs timeout <seconds>
no tacacs timeout
```

<seconds> - The connection timeout value of TACACS (Range: 1 – 30).

no - This command is used to reset the timeout value to the default value.

Default Setting

5

Command Mode

Global Config

9.21.6 Port Security Configuration Commands

9.21.6.1 port-security

This command enables port locking at the system level (Global Config) or port level (Interface Config).

Syntax

port-security
no port-security

Default Setting

None

Command Mode

Global Config, Interface Config

9.21.6.2 port-security max-dynamic

This command sets the maximum of dynamically locked MAC addresses allowed on a specific port.

Syntax

port-security max-dynamic [<0-600>]
no port-security max-dynamic

no - This command resets the maximum of dynamically locked MAC addresses allowed on a specific port to its default value.

Default Setting

600

Command Mode

Interface Config

9.21.6.3 port-security max-static

This command sets the maximum number of statically locked MAC addresses allowed on a specific port.

Syntax

```
port-security max-static [<0-20>]
no port-security max-static
```

no - This command resets the maximum number of statically locked MAC addresses allowed on a specific port to its default value.

Default Setting

20

Command Mode

Interface Config

9.21.6.4 port-security mac-address

This command adds a MAC address to the list of statically locked MAC addresses.

Syntax

```
port-security mac-address <mac-addr> <1-4094>
no port-security mac-address <mac-addr> <1-4094>
```

<1-4094> - VLAN ID

<mac-addr> - static mac address

no - This command removes a MAC address from the list of statically locked MAC addresses

Default Setting

None

Command Mode

Interface Config

9.21.6.5 port-security mac-address move

This command converts dynamically locked MAC addresses to statically locked addresses.

Syntax

```
port-security mac-address move
```

Default Setting

None

Command Mode

Interface Config

9.21.6.6 port-security violation shutdown

This command enables violation shutdown attribute of port-security.

Syntax

```
port-security violation shutdown
no port-security violation shutdown
```

no - This command disables violation shutdown attribute of port-security.

Default Setting

Disabled

Command Mode

Interface Config

9.21.7 LDAP Commands

9.21.7.1 show ldap

This command is used to display the current LDAP configuration.

Syntax

```
show ldap
```

Default Setting

None

Command Mode

Privileged Exec

Display Message

Server IP: LDAP server IP, default is 0.0.0.0.

Server Port: LDAP server TCP port, default is 389.

baseDN: Base distinguished name, default is empty string.

racName: RDN attribute of bind DN, default is empty string.

racDomain: Partial bind DN exclude RDN with it, default is empty string.

9.21.7.2 ldap ip

This command is used to configure LDAP server IP.

Syntax

```
ldap ip <ipaddr>
no ldap ip
```

<ipaddr> - The IP address.

no - This command is used to return the IP address to the default value.

Default Setting

0.0.0.0

Command Mode

Global Config

9.21.7.3 ldap port

This command is used to configure LDAP server port.

Syntax

```
ldap port <portid>
no ldap port
```

<portid> - 1-65535

no - This command is used to return the LDAP server port to the default value.

Default Setting

389

Command Mode

Global Config

9.21.7.4 ldap baseDN

This command is used to configure baseDN.

Syntax

```
ldap baseDN <baseDN>
no ldap baseDN
```

<baseDN> - string.

no - This command is used to return the baseDN to the default.

Default Setting

None

Command Mode

Global Config

9.21.7.5 ldap racName

This command is used to configure racName.

Syntax

```
ldap racName <racName>
no ldap racName
```

<racName> - string.

no - This command is used to return the racName to the default.

Default Setting

None

Command Mode

Global Config

9.21.7.6 ldap racDomain

This command is used to configure racDomain.

Syntax

```
ldap racDomain <racDomain>
no ldap racDomain
```

<racDomain> - string.

no - This command is used to return the racDomain to the default.

Default Setting

None

Command Mode

Global Config

9.21.8 Denial of Service (DoS) Commands

9.21.8.1 show dos-control

This command displays Denial of Service configuration information.

Syntax
show dos-control

Default Setting

None

Command Mode

Privileged Exec

Display Message

SIPDIP Mode: May be enabled or disabled. The factory default is disabled.

First Fragment Mode: May be enabled or disabled. The factory default is disabled.

Min TCP Hdr Size: The range is 0 - 255. The factory default is 20.

TCP Fragment Mode: May be enabled or disabled. The factory default is disabled.

TCP Flag Mode: May be enabled or disabled. The factory default is disabled.

L4 Port Mode: May be enabled or disabled. The factory default is disabled.

ICMP Mode: May be enabled or disabled. The factory default is disabled.

Max ICMPv4 Pkt Size: The range is 0-1023. The factory default is 512.

Max ICMPv6 Pkt Size: The range is 0-1023. The factory default is 512.

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9.21.8.2 dos-control firstfrag

This command enables Minimum TCP Header Size Denial of Service protection. If the mode is enabled, Denial of Service prevention is active for this type of attack. If packets ingress having a TCP Header Size smaller then the configured value, the packets will be dropped if the mode is enabled.The default is disabled. If you enable dos-control firstfrag, but do not provide a Minimum TCP Header Size, the system sets that value to 20.

Syntax

```
dos-control firstfrag [<0-255>]
no dos-control firstfrag
```

<0-255> - Configures minimum TCP header length.

no - This command sets Minimum TCP Header Size Denial of Service protection to the default value of disabled.

Default Setting

Disabled <20>

Command Mode

Global Config

9.21.8.3 dos-control icmp

This command enables Maximum ICMP Packet Size Denial of Service protections. If the mode is enabled, Denial of Service prevention is active for this type of attack. If ICMP Echo Request (PING) packets ingress having a size greater than the configured value, the packets will be dropped if the mode is enabled.

Syntax

```
dos-control icmp [<0-1023>]
no dos-control icmp
```

<0-1023> - Configures maximum ICMP packet size.

no - This command disables Maximum ICMP Packet Size Denial of Service protections.

Default Setting

Disabled <512>

Command Mode

Global Config

9.21.8.4 dos-control icmpv6

This command enables Maximum ICMPv6 Packet Size Denial of Service protections. If the mode is enabled, Denial of Service prevention is active for this type of attack. If ICMPv6 Echo Request (PING) packets ingress having a size greater than the configured value, the packets will be dropped if the mode is enabled.

Syntax

```
dos-control icmpv6 <0-1023>
no dos-control icmpv6
```

<0-1023> - Configures maximum ICMPv6 packet size.

no - This command disables Maximum ICMPv6 Packet Size Denial of Service protections.

Default Setting

Disabled <512>

Command Mode

Global Config

9.21.8.5 dos-control l4port

This command enables L4 Port Denial of Service protections. If the mode is enabled, Denial of Service prevention is active for this type of attack. If packets ingress having Source TCP/UDP Port Number equal to Destination TCP/UDP Port Number, the packets will be dropped if the mode is enabled.

Syntax

```
dos-control l4port
no dos-control l4port
```

no - This command disables L4 Port Denial of Service protections.

Default Setting

Disabled

Command Mode

Global Config

9.21.8.6 dos-control sipdip

This command enables Source IP address = Destination IP address (SIP=DIP) Denial of Service protection. If the mode is enabled, Denial of Service prevention is active for this type of attack. If packets ingress with SIP=DIP, the packets will be dropped if the mode is enabled.

Syntax

```
dos-control sipdip
no dos-control sipdip
```

no - This command disables Source IP address = Destination IP address (SIP=DIP) Denial of Service prevention.

Default Setting

Disabled

Command Mode

Global Config

9.21.8.7 dos-control tcpflag

This command enables TCP Flag Denial of Service protections. If the mode is enabled, Denial of Service prevention is active for this type of attacks. If packets ingress having TCP Flag SYN set and a source port less than 1024 or having TCP Control Flags set to 0 and TCP Sequence Number set to 0 or having TCP Flags FIN, URG, and PSH set and TCP Sequence Number set to 0 or having TCP Flags SYN and FIN both set, the packets will be dropped if the mode is enabled.

Syntax

```
dos-control tcpflag
no dos-control tcpflag
```

no - This command sets disables TCP Flag Denial of Service protections.

Default Setting

Disabled

Command Mode

Global Config

9.21.8.8 dos-control tcpfrag

This command enables TCP Fragment Denial of Service protection. If the mode is enabled, Denial of Service prevention is active for this type of attack. If packets ingress having IP Fragment Offset equal to one (1), the packets will be dropped if the mode is enabled.

Syntax

```
dos-control tcpfrag
no dos-control tcpfrag
```

no - This command disabled TCP Fragment Denial of Service protection.

Default Setting

Disabled

Command Mode

Global Config

9.22 Differentiated Service Commands

This chapter contains the CLI commands used for the QOS Differentiated Services (DiffServ) package.

The user configures DiffServ in several stages by specifying:

1. Class
    - creating and deleting classes
    - defining match criteria for a class

Note: The only way to remove an individual match criterion from an existing class definition is to delete the class and re-create it.

2. Policy
    - creating and deleting policies
    - associating classes with a policy
    - defining policy statements for a policy/class combination
3. Service
    - adding and removing a policy to/from a directional (that is, inbound, outbound) interface

Packets are filtered and processed based on defined criteria. The filtering criteria are defined by a class. The processing is defined by a policy's attributes. Policy attributes may be defined on a per class instance basis, and it is these attributes that are applied when a match occurs.

Packet processing begins by testing the match criteria for a packet. A policy is applied to a packet when a class match within that policy is found.

Note that the type of class - all, any, or acl - has a bearing on the validity of match criteria specified when defining the class. A class type of 'any' processes its match rules in an ordered sequence; additional rules specified for such a class simply extend this list. A class type of ‘acl’ obtains its rule list by interpreting each ACL rule definition at the time the Diffserv class is created. Differences arise when specifying match criteria for a class type 'all', since only one value for each non-excluded match field is allowed within a class definition. If a field is already specified for a class, all subsequent attempts to specify the same field fail, including the cases where a field can be specified multiple ways through alternative formats. The exception to this is when the 'exclude' option is specified, in which case this restriction does not apply to the excluded fields.

The following class restrictions are:

- nested class support limited to:
    - 'all' within 'all'
    - no nested 'not' conditions
    - no nested 'acl' class types
    - each class contains at most one referenced class
- hierarchical service policies not supported in a class definition

- access list matched by reference only, and must be sole criterion in a class
  - that is, ACL rules copied as class match criteria at time of class creation, with class type 'any'
  - implicit ACL 'deny all' rule also copied
  - no nesting of class type 'acl'

Regarding nested classes, referred to here as class references, a given class definition can contain at most one reference to another class, which can be combined with other match criteria. The referenced class is truly a reference and not a copy, since additions to a referenced class affect all classes that reference it. Changes to any class definition currently referenced by any other class must result in valid class definitions for all derived classes otherwise the change is rejected. A class reference may be removed from a class definition.

The user can display summary and detailed information for classes, policies, and services. All configuration information is accessible via the CLI, Web, and SNMP user interfaces.

9.22.1 General Commands

The following characteristics are configurable for the platform as a whole.

9.22.1.1 diffserv

This command sets the DiffServ operational mode to active. While disabled, the DiffServ configuration is retained and can be changed, but it is not activated. When enabled, Diffserv services are activated.

Syntax
diffserv

Command Mode

Global Config

9.22.1.2 no diffserv

This command sets the DiffServ operational mode to inactive. While disabled, the DiffServ configuration is retained and can be changed, but it is not activated. When enabled, Diffserv services are activated.

Syntax
no diffserv

Command Mode

Global Config

9.22.2 Class Commands

The 'class' command set is used in DiffServ to define:

Traffic Classification specifies Behavior Aggregate (BA) based on DSCP, and Multi- Field (MF) classes of traffic (name, match criteria)

Service Levels specifies the BA forwarding classes / service levels. Conceptually, DiffServ is a two-level hierarchy of classes: 1. Service/PHB, 2. Traffic Class

This set of commands consists of class creation/deletion and matching, with the class match commands specifying layer 3, layer 2, and general match criteria. The class match criteria are also known as class rules, with a class definition consisting of one or more rules to identify the traffic belonging to the class. Note that once a class match criterion is created for a class, it cannot be changed or deleted - the entire class must be deleted and re-created.

The CLI command root is **class-map**.

9.22.2.1 class-map

This command defines a new DiffServ class of type match-all, match-any or match-access-group.

Syntax
class-map [match-all] <class-map-name>

<class-map-name> is a case sensitive alphanumeric string from 1 to 31 characters uniquely identifying the class.

Note: The class name 'default' is reserved and must not be used here.

When used without any match condition, this command enters the class-map mode. The **<class-map-name>** is the name of an existing DiffServ class.

Note: The class name 'default' is reserved and is not allowed here. The class type of **match-all** indicates all of the individual match conditions must be true for a packet to be considered a member of the class. The class type of **match-access-group** indicates the individual class match criteria are evaluated based on an access list (ACL).

<aclid> is an integer specifying an existing ACL number (refer to the appropriate ACL documentation for the valid ACL number range). A **matchaccess-group** class type copies its set of match criteria from the current rule definition of the specified ACL number. All elements of a single ACL Rule are treated by DiffServ as a grouped set, similar to class type all. For any class, at least one class match condition must be specified for the class to be considered valid.

Note: The class match conditions are obtained from the referenced access list **at the time of class creation**. Thus, any subsequent changes to the referenced ACL definition do not affect the DiffServ class. To pick up the latest ACL definition, the DiffServ class must be deleted and recreated. This command may be used without specifying a class type to enter the Class-Map Config mode for an existing DiffServ class.

Note: The CLI mode is changed to Class-Map Config when this command is successfully executed.

Command Mode

Global Config

9.22.2.2 no class-map

This command eliminates an existing DiffServ class.

Syntax
no class-map <class-map-name>

<class-map-name> is the name of an existing DiffServ class.

Note: The class name 'default' is reserved and is not allowed here. This command may be issued at any time; if the class is currently referenced by one or more policies or by any other class, this deletion attempt shall fail.

Command Mode

Global Config

9.22.2.3 class-map rename

This command changes the name of a DiffServ class.

Syntax

```
class-map rename <class-map-name> <new-class-map-name>
```

<class-map-name> is the name of an existing DiffServ class.

<new-class-map-name> is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the class.

Note: The class name ‘default’ is reserved and must not be used here.

Default

None

Command Mode

Global Config

9.22.2.4 match any

This command adds to the specified class definition a match condition whereby all packets are considered to belong to the class.

Syntax

```
match any
```

Default

None

Command Mode

Class-Map Config

9.22.2.5 match class-map

This command adds to the specified class definition the set of match conditions defined for another class.

Syntax

match class-map <refclassname>

<refclassname> is the name of an existing DiffServ class whose match conditions are being referenced by the specified class definition.

Note: There is no **[not]** option for this match command.

Default

None

Command Mode

Class-Map Config

Restrictions The class types of both **<classname>** and **<refclassname>** must be identical (that is, any vs. any, or all vs. all). A class type of acl is not supported by this command. Cannot specify **<refclassname>** the same as **<classname>** (that is, self-referencing of class name not allowed). At most one other class may be referenced by a class. Any attempt to delete the **<refclassname>** class while still referenced by any **<classname>** shall fail.

The combined match criteria of **<classname>** and **<refclassname>** must be an allowed combination based on the class type. Any subsequent changes to the **<refclassname>** class match criteria must maintain this validity, or the change attempt shall fail. The total number of class rules formed by the complete reference class chain (includes both predecessor and successor classes) must not exceed a platform-specific maximum. In some cases, each removal of a refclass rule reduces the maximum number of available rules in the class definition by one.

9.22.2.6 no match class-map

This command removes from the specified class definition the set of match conditions defined for another class.

Syntax

```
no match class-map <refclassname>
```

<refclassname> is the name of an existing DiffServ class whose match conditions are being referenced by the specified class definition.

Note: There is no **[not]** option for this match command.

Default

None

Command Mode

Class-Map Config

9.22.2.7 match dstip

This command adds to the specified class definition a match condition based on the destination IP address of a packet.

Syntax

```
match dstip <ipaddr> <ipmask>
```

<ipaddr> specifies an IP address.

<ipmask> specifies an IP address bit mask; note that although similar to a standard subnet mask, this bit mask need not be contiguous.

Default

None

Command Mode

Class-Map Config

9.22.2.8 match dstl4port

This command adds to the specified class definition a match condition based on the destination layer 4 port of a packet using a single keyword or numeric notation or a numeric range notation.

Syntax

match dstl4port {<portkey> | <0-65535>}

To specify the match condition as a single keyword, the value for **<portkey>** is one of the supported port name keywords. The currently supported **<portkey>** values are: **domain, echo, ftp, ftpdata, http, smtp, snmp, telnet, tftp, www**. Each of these translates into its equivalent port number, which is used as both the start and end of a port range.

To specify the match condition using a numeric notation, one layer 4 port number is required.

The port number is an integer from 0 to 65535.

To specify the match condition using a numeric range notation, two layer 4 port numbers are required and together they specify a contiguous port range. Each port number is an integer from 0 to 65535, but with the added requirement that the second number be equal to or greater than the first.

Default

None

Command Mode

Class-Map Config

9.22.2.9 match ip dscp

This command adds to the specified class definition a match condition based on the value of the IP DiffServ Code Point (DSCP) field in a packet, which is defined as the high-order six bits of the Service Type octet in the IP header (the low-order two bits are not checked).

Syntax

match ip dscp <value>

<dscpval> value is specified as either an integer from 0 to 63, or symbolically through one of the following keywords: af11, af12, af13, af21, af22, af23, af31, af32, af33, af41, af42, af43, be, cs0, cs1, cs2, cs3, cs4, cs5, cs6, cs7, ef.

Note: The ip dscp, ip precedence, and ip tos match conditions are alternative ways to specify a match criterion for the same Service Type field in the IP header, but with a slightly different user notation.

Note: To specify a match on all DSCP values, use the match [not] ip tos <tosbits> <tosmask> command with **<tosbits>** set to 0 and **<tosmask>** set to 03 (hex).

Default

None

Command Mode

Class-Map Config

9.22.2.10 match ip precedence

This command adds to the specified class definition a match condition based on the value of the IP Precedence field in a packet, which is defined as the high-order three bits of the Service Type octet in the IP header (the low-order five bits are not checked). The precedence value is an integer from 0 to 7.

Syntax

match ip precedence <0-7>

Note: The ip dscp, ip precedence, and ip tos match conditions are alternative ways to specify a match criterion for the same Service Type field in the IP header, but with a slightly different user notation.

Note: To specify a match on all Precedence values, use the match [not] ip tos <tosbits> <tosmask> command with **<tosbits>** set to 0 and **<tosmask>** set to 1F (hex).

Default

None

Command Mode

Class-Map Config

9.22.2.11 match ip tos

This command adds to the specified class definition a match condition based on the value of the IP TOS field in a packet, which is defined as all eight bits of the Service Type octet in the IP header.

Syntax

match ip tos <tosbits> <tosmask>

<tosbits> is a two-digit hexadecimal number from 00 to ff.

<tosmask> is a two-digit hexadecimal number from 00 to ff.

The **<tosmask>** denotes the bit positions in **<tosbits>** that are used for comparison against the IP TOS field in a packet. For example, to check for an IP TOS value having bits 7 and 5 set and bit 1 clear, where bit 7 is most significant, use a **<tosbits>** value of a0 (hex) and a **<tosmask>** of a2 (hex).

Note: The ip dscp, ip precedence, and ip tos match conditions are alternative ways to specify a match criterion for the same Service Type field in the IP header, but with a slightly different user notation.

Note: In essence, this the “free form” version of the IP DSCP/Precedence/TOS match specification in that the user has complete control of specifying which bits of the IP Service Type field are checked.

Default

None

Command Mode

Class-Map Config

9.22.2.12 match protocol

This command adds to the specified class definition a match condition based on the value of the IP Protocol field in a packet using a single keyword notation or a numeric value notation.

Syntax

match protocol {<protocol-name> | <0-255>}

<protocol-name> is one of the supported protocol name keywords. The currently supported values are: **icmp, igmp, ip, tcp, udp**. Note that a value of **ip** is interpreted to match all protocol number values. To specify the match condition using a numeric value notation, the protocol number is a standard value assigned by IANA and is interpreted as an integer from 0 to 255.

Note: This command does not validate the protocol number value against the current list defined by IANA.

Default

None

Command Mode

Class-Map Config

9.22.2.13 match srcip

This command adds to the specified class definition a match condition based on the source IP address of a packet.

Syntax

match srcip <ipaddr> <ipmask>

<ipaddr> specifies an IP address.

<ipmask> specifies an IP address bit mask; note that although it resembles a standard subnet mask, this bit mask need not be contiguous.

Default

None

Command Mode

Class-Map Config

9.22.2.14 match srcl4port

This command adds to the specified class definition a match condition based on the source layer 4 port of a packet using a single keyword or numeric notation or a numeric range notation.

Syntax

match srcl4port {<portkey> | <0-65535>}

<portkey> is one of the supported port name keywords (listed below).

The currently supported <portkey> values are: domain, echo, ftp, ftpdata, http, smtp, snmp, telnet, tftp, www. Each of these translates into its equivalent port number, which is used as both the start and end of a port range.

To specify the match condition as a numeric value, one layer 4 port number is required. The port number is an integer from 0 to 65535.

To specify the match condition as a range, two layer 4 port numbers are required and together they specify a contiguous port range. Each port number is an integer from 0 to 65535, but with the added requirement that the second number be equal to or greater than the first.

Default

None

Command Mode

Class-Map Config

9.22.2.15 match cos

This command adds to the specified class definition a match condition for the Class of Service value (the only tag in a single tagged packet or the first or outer 802.1Q tag of a double VLAN tagged packet). The value may be from 0 to 7.

NOTE: This command is not available on the Broadcom 5630x platform.

Syntax

match cos <0-7>

Default Setting

None

Command Mode

Class-Map Config

9.22.2.16 match destination-address mac

This command adds to the specified class definition a match condition based on the destination MAC address of a packet. The <address> parameter is any layer 2 MAC address formatted as six, two-digit hexadecimal numbers separated by colons (e.g., 00:11:22:dd:ee:ff). The <mac-mask> parameter is a layer 2 MAC address bit mask, which need not be contiguous, and is formatted as six, two-digit hexadecimal numbers separated by colons (e.g., ff:07:23:ff:fe:dc).

NOTE: This command is not available on the Broadcom 5630x platform.

Syntax

match destination-address mac <address> <mac-mask>

<address> - Specifies any layer 2 MAC address.

<mac-mask> - Specifies a layer 2 MAC address bit mask.

Default Setting

None

Command Mode

Class-Map Config

9.22.2.17 match ethertype

This command adds to the specified class definition a match condition based on the value of the ethertype. The <ethertype> value is specified as one of the following keywords: **appletalk, arp, ibmsna, ipv4, ipv6, ipx, mplsmcast, mplsucast, netbios, novell, pppoe, rarp** or as a custom ethertype value in the range of 0x0600-0xFFFF.

NOTE: This command is not available on the Broadcom 5630x platform.

Syntax

match ethertype {<keyword> | <0x0600-0xFFFF>}

<keyword> - Specifies appletalk, arp, ibmsna, ipv4, ipv6, ipx, mplsmcast etc

<0x0600-0xFFFF> - Specifies ethertype value.

Default Setting

None

Command Mode

Class-Map Config

9.22.2.18 match source-address mac

This command adds to the specified class definition a match condition based on the source MAC address of a packet. The <address> parameter is any layer 2 MAC address formatted as six, two-digit hexadecimal numbers separated by colons (e.g., 00:11:22:dd:ee:ff). The <macmask> parameter is a layer 2 MAC address bit mask, which may not be contiguous, and is formatted as six, two-digit hexadecimal numbers separated by colons (e.g., ff:07:23:ff:fe:dc).

NOTE: This command is not available on the Broadcom 5630x platform.

Syntax

match source-address mac <address> <macmask>

<address> - Specifies any layer 2 MAC address.

<macmask> - Specifies a layer 2 MAC address bit mask.

Default Setting

None

Command Mode

Class-Map Config

9.22.2.19 match vlan

This command adds to the specified class definition a match condition based on the value of the layer 2 VLAN Identifier field (the only tag in a single tagged packet or the first or outer tag of a double VLAN tagged packet). The VLAN ID is an integer from 0 to 4093.

NOTE: This command is not available on the Broadcom 5630x platform.

Syntax
match vlan <0-4093>

Default Setting

None

Command Mode

Class-Map Config

9.22.3 Policy Commands

The 'policy' command set is used in DiffServ to define:

Traffic Conditioning Specify traffic conditioning actions (policing, marking, shaping) to apply to traffic classes

Service Provisioning Specify bandwidth and queue depth management requirements of service levels (EF, AF, etc.)

The policy commands are used to associate a traffic class, which was defined by the class command set, with one or more QoS policy attributes. This association is then assigned to an interface in a particular direction to form a service. The user specifies the policy name when the policy is created.

The DiffServ CLI does not necessarily require that users associate only one traffic class to one policy. In fact, multiple traffic classes can be associated with a single policy, each defining a particular treatment for packets that match the class definition. When a packet satisfies the conditions of more than one class, preference is based on the order in which the classes were added to the policy, with the foremost class taking highest precedence.

This set of commands consists of policy creation/deletion, class addition/removal, and individual policy attributes. Note that the only way to remove an individual policy attribute from a class instance within a policy is to remove the class instance and re-add it to the policy. The values associated with an existing policy attribute can be changed without removing the class instance.

The CLI command root is **policy-map**.

9.22.3.1 assign-queue

This command modifies the queue id to which the associated traffic stream is assigned. The queueid is an integer from 0 to n-1, where n is the number of egress queues supported by the device.

Syntax

assign-queue <0-7>

<0-7> - Queue ID.

(*)<0-6> - Queue ID.

Note: (*) is the stacking command.

Command Mode

Policy-Class-Map Config

Incompatibilities

Drop

9.22.3.2 drop

This command specifies that all packets for the associated traffic stream are to be dropped at ingress.

Syntax
drop

Command Mode

Policy-Class-Map Config

Incompatibilities

Assign Queue, Mark (all forms), Mirror, Police, Redirect

9.22.3.3 mirror

This command specifies that all incoming packets for the associated traffic stream are copied to a specific egress interface (physical port or LAG).

NOTE: This command is not available on the Broadcom 5630x platform.

Syntax
mirror <slot/port>

<slot/port> - Interface Number.

Default Setting

None

Command Mode

Policy-Class-Map Config

Incompatibilities

Drop, Redirect

9.22.3.4 redirect

This command specifies that all incoming packets for the associated traffic stream are redirected to a specific egress interface (physical port or port-channel).

Syntax

```
redirect <slot/port>
```

Command Mode

Policy-Class-Map Config

Incompatibilities

Drop, Mirror

9.22.3.5 conform-color

This command is used to enable color-aware traffic policing and define the conform-color class maps used. Used in conjunction with the police command where the fields for the conform level (for simple, single-rate, and two-rate policing) are specified. The <class-map-name> parameter is the name of an existing Diffserv class map, where different ones must be used for the conform and exceed colors.

Syntax

```
conform-color <class-map-name>
```

<class-map-name> - Name of an existing Diffserv class map, where different ones must be used for the conform colors.

Command Mode

Policy-Class-Map Config

Incompatibilities

Drop, Mirror

9.22.3.6 mark ip-dscp

This command marks all packets for the associated traffic stream with the specified IP DSCP value.

Syntax

mark ip-dscp <value>

<value> is specified as either an integer from 0 to 63, or symbolically through one of the following keywords: **af11, af12, af13, af21, af22, af23, af31, af32, af33, af41, af42, af43, be, cs0, cs1, cs2, cs3, cs4, cs5, cs6, cs7, ef**.

Command Mode

Policy-Class-Map Config

Policy Type In

Incompatibilities

Drop, Mark CoS, IP Precedence, Police

9.22.3.7 mark ip-precedence

This command marks all packets for the associated traffic stream with the specified IP Precedence value. The IP Precedence value is an integer from 0 to 7.

Syntax

mark ip-precedence <0-7>

Command Mode

Policy-Class-Map Config

Policy Type In

Incompatibilities

Drop, Mark (all forms)

9.22.3.8 police-simple

This command is used to establish the traffic policing style for the specified class.

Syntax

police-simple {<1-4294967295> <1-128> conform-action
{drop | set-prec-transmit <0-7> | set-dscp-transmit
<0-63> | transmit} [violate-action {drop | set-prectransmit <0-7> | set-dscp-transmit <0-63> | transmit}]}

The simple form of the police command uses a single data rate and burst size, resulting in two outcomes:

<conform-action & violate-action> The conforming data rate is specified in kilobits-per-second (Kbps) and is an integer from 1 to 4294967295. The conforming burst size is specified in kilobytes (KB) and is an integer from 1 to 128. For each outcome, the only possible actions are drop, set-dscp-transmit, set-prec-transmit, or transmit. In this simple form of the police command, the conform action defaults to transmit and the violate action defaults to drop. These actions can be set with this command once the style has been configured. **<set-dscp-transmit>** is required and is specified as either an integer from 0 to 63, or symbolically through one of the following keywords: **af11, af12, af13, af21, af22, af23, af31, af32, af33, af41, af42, af43, be, cs0, cs1, cs2, cs3, cs4, cs5, cs6, cs7, ef**.

<set-prec-transmit>, an IP Precedence value is required and is specified as an integer from 0-7.

Command Mode

Policy-Class-Map Config

Restrictions Only one style of police command, simple, is allowed for a given class instance in a particular policy.

Policy Type In

Incompatibilities

Drop, Mark (all forms)

9.22.3.9 class

This command creates an instance of a class definition within the specified policy for the purpose of defining treatment of the traffic class through subsequent policy attribute statements.

Syntax

```
class <classname>
```

<classname> is the name of an existing DiffServ class. Note that this command causes the specified policy to create a reference to the class definition.

Command Mode

Policy-Class-Map Config

9.22.3.10 no class

This command deletes the instance of a particular class and its defined treatment from the specified policy.

Syntax

```
no class <classname>
```

<classname> is the name of an existing DiffServ class. Note that this command removes the reference to the class definition for the specified policy.

Command Mode

Policy-Class-Map Config

9.22.3.11 policy-map

This command establishes a new DiffServ policy. The <policyname**>** parameter is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the policy. The type of policy is specific to the inbound traffic direction as indicated by the in parameter.

Syntax

```
policy-map <policyname> [ in ]
no policy-map <policyname>
```

Command Mode

Global Config

Policy Type In

9.22.3.12 policy-map rename

This command changes the name of a DiffServ policy. The <policyname**>** is the name of an existing DiffServ class. The <newpolicyname**>** parameter is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the policy.

Syntax

```
policy-map rename <policyname> <newpolicyname>
```

<policyname> - Old Policy name.

<newpolicyname> - New policy name.

Command Mode

Global Config

Policy Type In

9.22.4 Service Commands

The 'service' command set is used in DiffServ to define:

Traffic Conditioning Assign a DiffServ traffic conditioning policy (as specified by the policy commands) to an interface in the incoming direction.

Service Provisioning Assign a DiffServ service provisioning policy (as specified by the policy commands) to an interface in the outgoing direction

The service commands attach a defined policy to a directional interface. Only one policy may be assigned at any one time to an interface in a particular direction. The policy type (in, out) must match the interface direction to which it is attached.

This set of commands consists of service addition/removal.

The CLI command root is **service-policy**

9.22.4.1 service-policy

This command attaches a policy to an interface in a particular direction.

Syntax
service-policy in <policy-map-name>

The command can be used in the **Interface Config** mode to attach a policy to a specific interface. Alternatively, the command can be used in the **Global Config** mode to attach this policy to all system interfaces. The direction value is either in or out.

<policy-map-name> is the name of an existing DiffServ policy, whose type must match the interface direction. Note that this command causes a service to create a reference to the policy.

Note: This command effectively enables DiffServ on an interface (in a particular direction). There is no separate interface administrative 'mode' command for DiffServ.

Note: This command shall fail if any attributes within the policy definition exceed the capabilities of the interface. Once a policy is successfully attached to an interface, any attempt to change the policy definition such that it would result in a violation of said interface capabilities shall cause the policy change attempt to fail.

Command Mode

Global Config (for all system interfaces)

Interface Config (for a specific interface)

Restrictions Only a single policy may be attached to a particular interface in a particular direction at any one time.

9.22.4.2 no service-policy

This command detaches a policy from an interface in a particular direction.

Syntax

no service-policy in <policy-map-name>

The command can be used in the Interface Config mode to detach a policy from a specific interface. Alternatively, the command can be used in the Global Config mode to detach this policy from all system interfaces to which it is currently attached. The direction value is either in or out.

<policy-map-name> is the name of an existing DiffServ policy. Note that this command causes a service to remove its reference to the policy.

Note: This command effectively disables DiffServ on an interface (in a particular direction).

There is no separate interface administrative 'mode' command for DiffServ.

Command Mode

Global Config (for all system interfaces)

Interface Config (for a specific interface)

9.22.5 Show Commands

The 'show' command set is used in DiffServ to display configuration and status information for:

- Classes
- Policies
- Services

This information can be displayed in either summary or detailed formats. The status information is only shown when the DiffServ administrative mode is enabled; it is suppressed otherwise. There is also a 'show' command for general DiffServ information that is available at any time.

9.22.5.1 show diffserv

This command displays the DiffServ General Status Group information, which includes the current administrative mode setting as well as the current and maximum number of rows in each of the main DiffServ private MIB tables.

Syntax
show diffserv

Default Setting

None

Command Mode

Privileged EXEC and User EXEC

Display Message

DiffServ Admin mode: The current value of the DiffServ administrative mode.

Class Table Size Current/Max: The current or maximum number of entries (rows) in the Class Table.

Class Rule Table Size Current/Max: The current or maximum number of entries (rows) in the Class Rule Table.

Policy Table Size Current/Max: The current or maximum number of entries (rows) in the Policy Table.

Policy Instance Table Size Current/Max: The current or maximum number of entries (rows) in the Policy Instance Table.

Policy Attribute Table Size Current/Max: The current or maximum number of entries (rows) in the Policy Attribute Table.

Service Table Size Current/Max: The current or maximum number of entries (rows) in the Service Table.

9.22.5.2 show diffserv service

This command displays policy service information for the specified interface and direction.

Syntax

show diffserv service <slot/port> in

<slot/port> specifies a valid slot number and port number for the system. The direction parameter indicates the interface direction of interest.

Default Setting

None

Command Mode

Privileged EXEC

Display Message

DiffServ Admin Mode: The current setting of the DiffServ administrative mode. An attached policy is only in effect on an interface while DiffServ is in an enabled mode.

Interface: The slot number and port number of the interface (slot/port).

Direction: The traffic direction of this interface service.

Operational Status: The current operational status of this DiffServ service interface.

Policy Name: The name of the policy attached to the interface in the indicated direction.

Policy Details: Attached policy details, whose content is identical to that described for the show policy-map <policymapname> command (content not repeated here for brevity).

9.22.5.3 show diffserv service brief

This command displays all interfaces in the system to which a DiffServ policy has been attached. The direction parameter is optional; if specified, only services in the indicated direction are shown.

Syntax
show diffserv service brief [in]

Default Setting

None

Command Mode

Privileged EXEC

Display Message

DiffServ Admin Mode: The current setting of the DiffServ administrative mode. An attached policy is only active on an interface while DiffServ is in an enabled mode.

The following information is repeated for interface and direction (only those interfaces configured with an attached policy are shown):

Interface: The slot number and port number of the interface (slot/port).

Direction: The traffic direction of this interface service.

OperStatus: The current operational status of this DiffServ service interface.

Policy Name: The name of the policy attached to the interface in the indicated direction.

9.22.5.4 show class-map

This command displays all configuration information for the specified class.

Syntax

show class-map [<classname>]

<classname> is the name of an existing DiffServ class.

Default Setting

None

Command Mode

Privileged EXEC and User EXEC

Display Message

Class Name: The name of this class.

Class Type: The class type (all, any, or acl) indicating how the match criteria are evaluated for this class. A class type of all means every match criterion defined for the class is evaluated simultaneously they must all be true to indicate a class match. For a type of any each match criterion is evaluated sequentially and only one need be true to indicate a class match. Class type acl rules are evaluated in a hybrid manner, with those derived from each ACL Rule grouped and evaluated simultaneously, while each such grouping is evaluated sequentially.

Match Criteria: The Match Criteria fields will only be displayed if they have been configured. They will be displayed in the order entered by the user. These are evaluated in accordance with the class type. The possible Match Criteria fields are: Class of Service, Destination IP Address, Destination Layer 4 Port, Destination MAC Address, Every, IP DSCP, IP Precedence, IP TOS, Protocol Keyword, Reference Class, Source IP Address, Source Layer 4 Port, Source MAC Address, and VLAN.

Values: This field displays the values of the Match Criteria.

Excluded: This field indicates whether this Match Criteria is excluded. If the Class Name is not specified, this command displays a list of all defined DiffServ classes. The following fields are displayed:

Class Name: The name of this class. (Note that the order in which classes are displayed is not necessarily the same order in which they were created.)

Class Type: The class type (all, any, or acl) indicating how the match criteria are evaluated for this class. A class type of all means every match criterion defined for the class is evaluated simultaneously they must all be true to indicate a class match. For a type of any each match criterion is evaluated sequentially and only one need be true to indicate a class match. Class type acl rules are evaluated in a hybrid manner, with those derived from each ACL Rule grouped and evaluated simultaneously, while each such grouping is evaluated sequentially.

ACL Number: The ACL number used to define the class match conditions at the time the class was created. This field is only meaningful if the class type is acl. (Note that the contents of the ACL may have changed since this class was created.)

Ref Class Name: The name of an existing DiffServ class whose match conditions are being referenced by the specified class definition.

9.22.5.5 show policy-map

This command displays all configuration information for the specified policy.

Syntax

show policy-map [<policy-map-name>]

<policy-map-name> is the name of an existing DiffServ policy.

Default Setting

None

Command Mode

Privileged EXEC

Display Message

Policy Name: The name of this policy.

Policy Type: The policy type, namely whether it is an inbound or outbound policy definition.

The following information is repeated for each class associated with this policy

(only those policy attributes actually configured are displayed):

Class Name: The name of this class.

Mark IP DSCP: Denotes the mark/re-mark value used as the DSCP for traffic matching this class. This is not displayed if mark ip description is not specified using the police-two-rate command, or if policing is in use for the class under this policy.

Mark IP Precedence: Denotes the mark/re-mark value used as the IP Precedence for traffic matching this class. This is not displayed if either mark DSCP or policing is in use for the class under this policy.

Policing Style: This field denotes the style of policing, if any, used simple.

Committed Rate (Kbps): This field displays the committed rate, used in simple policing, single-rate policing, and two-rate policing.

Committed Burst Size (KB): This field displays the committed burst size, used in simple policing.

Conform Action: The current setting for the action taken on a packet considered to conform to the policing parameters. This is not displayed if policing is not in use for the class under this policy.

Conform DSCP Value: This field shows the DSCP mark value if the conform action is markdscp.

Conform IP Precedence Value: This field shows the IP Precedence mark value if the conform action is markprec.

Non-Conform Action: The current setting for the action taken on a packet considered to not conform to the policing parameters. This is not displayed if policing not in use for the class under this policy.

Non-Conform DSCP Value: This field displays the DSCP mark value if this action is markdscp.

Non-Conform IP Precedence Value: This field displays the IP Precedence mark value if this action is markprec.

Assign Queue: Directs traffic stream to the specified QoS queue. This allows a traffic classifier to specify which one of the supported hardware queues are used for handling packets belonging to the class.

Drop: Drop a packet upon arrival. This is useful for emulating access control list operation using DiffServ, especially when DiffServ and ACL cannot co-exist on the same interface.

Mirror: Copies a classified traffic stream to a specified egress port (physical port or LAG). This can occur in addition to any marking or policing action. It may also be specified along with a QoS queue assignment.

Redirect: Forces a classified traffic stream to a specified egress port (physical port or LAG). This can occur in addition to any marking or policing action. It may also be specified along with a QoS queue assignment.

Policy Name: The name of this policy. (Note that the order in which the policies are displayed is not necessarily the same order in which they were created.)

Policy Type: The policy type, namely whether it is an inbound or outbound policy definition.

Class Members: List of all class names associated with this policy.

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9.22.5.6 show policy-map interface

This command displays policy-oriented statistics information for the specified interface and direction.

Syntax

show policy-map interface <slot/port> in

<slot/port> specifies a valid slot number and port number for the system. The direction parameter indicates the interface direction of interest.

Command Mode

Privileged EXEC

Display Message

Interface: The slot number and port number of the interface (slot/port).

Direction: The traffic direction of this interface service, either in or out.

Operational Status: The current operational status of this DiffServ service interface.

Policy Name: The name of the policy attached to the interface in the indicated direction.

Interface Offered Octets/Packets: A cumulative count of the octets/packets offered to this service interface in the specified direction before the defined DiffServ treatment is applied.

Interface Discarded Octets/Packets: A cumulative count of the octets/packets discarded by this service interface in the specified direction for any reason due to DiffServ treatment.

Interface Sent Octets/Packets: A cumulative count of the octets/packets forwarded by this service interface in the specified direction after the defined DiffServ treatment was applied. In this case, forwarding means the traffic stream was passed to the next functional element in the data path, such as the switching or routing function or an outbound link transmission element.

The following information is repeated for each class instance within this policy:

Class Name: The name of this class instance.

In Offered Octets/Packets: A count of the octets/packets offered to this class instance before the defined DiffServ treatment is applied. Only displayed for the 'in' direction.

In Discarded Octets/Packets: A count of the octets/packets discarded for this class instance for any reason due to DiffServ treatment of the traffic class. Only displayed for the 'in' direction.

Tail Dropped Octets/Packets: A count of the octets/packets discarded due to tail dropping from a transmission queue, typically due to the effects of traffic shaping. These counts may not be supported on all platforms. Only displayed for the 'out' direction.

Random Dropped Octets/Packets: A count of the octets/packets discarded due to WRED active queue depth management, typically due to the effects of traffic shaping. These counts are only applicable for a class instance whose policy attributes includes random dropping, and may not be supported on all platforms. Only displayed for the 'out' direction.

Shape Delayed Octets/Packets: A count of the octets/packets that were delayed due to traffic shaping. These counts are only applicable for a class instance whose policy attributes includes shaping, and may not be supported on all platforms. Only displayed for the 'out' direction.

Sent Octets/Packets: A count of the octets/packets forwarded for this class instance after the defined DiffServ treatment was applied. In this case, forwarding means the traffic stream was passed to the

next functional element in the data path, such as the switching or routing function or an outbound link transmission element. Only displayed for the 'out' direction.

Note: None of the counters listed here are guaranteed to be supported on all platforms. Only supported counters are shown in the display output.

9.22.5.7 show service-policy

This command displays a summary of policy-oriented statistics information for all interfaces in the specified direction. The direction parameter indicates the interface direction of interest. This command enables or disables the route reflector client. A route reflector client relies on a route reflector to re-advertise its routes to the entire AS. The possible values for this field are *enable* and *disable.*

Syntax
show service-policy [in]

Command Mode

Privileged EXEC

Display Message

The following information is repeated for each interface and direction (only those interfaces configured with an attached policy are shown):

Interface: The slot number and port number of the interface (slot/port).

Operational Status: The current operational status of this DiffServ service interface.

Policy Name: The name of the policy attached to the interface.

Note: None of the counters listed here are guaranteed to be supported on all platforms. Only supported counters are shown in the display output.

9.23 ACL Commands

9.23.1 Show Commands

9.23.1.1 show mac access-lists

This command displays a MAC access list and all of the rules that are defined for the ACL. The <name> parameter is used to identify a specific MAC ACL to display.

Syntax
show mac access-list <name>

<name> ACL name which uniquely identifies the MAC ACL to display.

Default Setting

None

Command Mode

Privileged EXEC

Display Message

MAC ACL Name: The name of the MAC ACL rule.

Rule Number: The ordered rule number identifier defined within the ACL.

Action: Displays the action associated with each rule. The possible values are Permit or Deny.

Source MAC Address: Displays the source MAC address for this rule.

Source MAC Mask: Displays the source MAC mask for this rule.

Destination MAC Address: Displays the destination MAC address for this rule.

Destination MAC Mask: Displays the destination MAC mask for this rule.

Ethertype: Displays the Ethertype keyword or custom value for this rule.

VLAN ID: Displays the VLAN identifier value or range for this rule.

CoS Value: Displays the COS (802.1p) value for this rule.

Secondary VLAN ID: Displays the Secondary VLAN identifier value or range for this rule.

Secondary COS: Displays the Secondary COS (802.1p) value for this rule.

Assign Queue: Displays the queue identifier to which packets matching this rule are assigned.

Redirect Interface: Displays the slot/port to which packets matching this rule are forwarded.

Mirror Interface: Displays the slot/port to which packets matching this rule are copied.

9.23.1.2 show mac access-lists

This command displays a summary of all defined MAC access lists in the system.

Syntax
show mac access-list

Default Setting

None

Command Mode

Privileged EXEC

Display Message

Current number of all ACLs: The number of user-configured rules defined for this ACL.

Maximum number of all ACLs: The maximum number of ACL rules.

MAC ACL Name: The name of the MAC ACL rule.

Rules: The number of rule in this ACL.

Direction: Denotes the direction in which this MAC ACL is attached to the set of interfaces listed. The possible values are Inbound or Outbound.

Interfaces: Displays the list of interfaces (slot/port) to which this MAC ACL is attached in a given direction.

9.23.1.3 show ip access-lists

This command displays an Access Control List (ACL) and all of the rules that are defined for the ACL.

Syntax

show ip access-lists [<1-199> | <name>]

<1-199> is the number used to identify the ACL.

<name> is the name used to identify the ACL.

Default Setting

None

Command Mode

Privileged EXEC

Display Message

Current number of ACLs: The number of user-configured rules defined for this ACL.

Maximum number of ACLs: The maximum number of ACL rules.

ACL ID/Name: The identifier of this ACL.

Rule: This displays the number identifier for each rule that is defined for the ACL.

Action: This displays the action associated with each rule. The possible values are Permit or Deny.

Match ALL: Match all packets or not.

Protocol: This displays the protocol to filter for this rule.

Source IP Address: This displays the source IP address for this rule.

Source IP Mask: This field displays the source IP Mask for this rule.

Source L4 Port Keyword: This field displays the source port range for this rule.

Destination IP Address: This displays the destination IP address for this rule.

Destination IP Mask: This field displays the destination IP Mask for this rule.

Destination L4 Port Keyword: This field displays the destination port range for this rule.

IP DSCP: This field displays the IP DSCP value for this rule.

IP Precedence: This field displays the IP Precedence value for this rule.

IP TOS: This field displays the IP TOS value for this rule.

Log: This field displays when you enable logging for this rule.

Assign Queue: This field displays the queue identifier to which packets matching this rule are assigned.

Mirror Interface: This field displays the slot/port to which packets matching this rule are copied.

Redirect Interface: This field displays the slot/port to which packets matching this rule are forwarded.

9.23.1.4 show access-lists interface

This command displays Access List information for a particular interface and the 'in' direction.

Syntax

show access-lists interface <slot/port> in

<slot/port> is the interface number.

Default Setting

None

Command Mode

Privileged EXEC

Display Message

ACL Type: This displays ACL type is IP or MAC.

ACL ID/Name: This displays the ACL ID/Name.

Sequence Number: This indicates the order of this access list relative to other access lists already assigned to this interface and direction. A lower number indicates higher precedence order.

9.23.2 Configuration Commands

9.23.2.1 mac access-list extended

This command creates a MAC Access Control List (ACL) identified by <name>, consisting of classification fields defined for the Layer 2 header of an Ethernet frame. The <name> parameter is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the MAC access list. If a MAC ACL by this name already exists, this command enters Mac-Access-List config mode to allow updating the existing ACL.

Syntax

```
mac access-list extended <name>
no mac access-list extended <name>
```

<name> - It uniquely identifies the MAC access list.

Default Setting

None

Command Mode

Global Config

9.23.2.2 mac access-list extended

This command changes the name of a MAC Access Control List (ACL). The <name> parameter is the name of an existing MAC ACL. The <newname> parameter is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the MAC access list. This command fails if a MAC ACL by the name <newname> already exists.

Syntax

```
mac access-list extended rename <name> <newname>
```

<name> - Old name which uniquely identifies the MAC access list.

<newname> - New name which uniquely identifies the MAC access list.

Default Setting

None

Command Mode

Global Config

9.23.2.3 mac access-list

This command creates a new rule for the current MAC access list. Each rule is appended to the list of configured rules for the list. Note that an implicit 'deny all' MAC rule always terminates the access list. Note: The 'no' form of this command is not supported, as the rules within an ACL cannot be deleted individually. Rather, the entire ACL must be deleted and re-specified.

A rule may either deny or permit traffic according to the specified classification fields. At a minimum, the source and destination MAC value and mask pairs must be specified, each of which may be substituted using the keyword any to indicate a match on any value in that field. The bpdu keyword may be specified for the destination MAC value/mask pair indicating a well-known BPDU MAC value of 01-80-c2-xx-xx-xx (hex), where 'xx' indicates a don't care. The remaining command parameters are all optional. The Ethertype may be specified as either a keyword or a four-digit hexadecimal value from 0x0600-0xFFFF. The currently supported <ethertypekey> values are: appletalk, arp, ibmsna, ipv4, ipv6, ipx, mplsmcast, mplsucast, netbios, novell, pppoe, rarp. Each of these translates into its equivalent Ethertype value(s). The assign-queue parameter allows specification of a particular hardware queue for handling traffic that matches this rule. The allowed <queue-id> value is 0-(n-1), where n is the number of user configurable queues available for the hardware platform. The redirect parameter allows the traffic matching this rule to be forwarded to the specified <slot/port>. The assign-queue and redirect parameters are only valid for a 'permit' rule.

Syntax

{deny | permit} {{<srcmac> <srcmask>} | any} {{<dstmac> <dstmask>} | any | bpdu} [<ethertypekey> | <0x0600-0xFFFF>] [vlan {{eq <0-4093>}} [cos <0-7>] [log] [assign-queue <queue-id>] [{mirror | redirect} <slot/port>] [<rule-id>]

Default Setting

None

Command Mode

Mac Access-list Config

9.23.2.4 mac access-group in

This command attaches a specific MAC Access Control List (ACL) identified by <name> to an interface in a given direction. The <name> parameter must be the name of an exsiting MAC ACL. An optional sequence number may be specified to indicate the order of this access list relative to other access lists already assigned to this interface and direction. A lower number indicates higher precedence order. If a sequence number is already in use for this interface and direction, the specified access list replaces the currently attached access list using that sequence number. If the sequence number is not specified for this command, a sequence number that is one greater than the highest sequence number currently in use for this interface and direction will be used. This command specified in 'Interface Config' mode only affects a single interface, whereas the 'Global Config' mode setting is applied to all interfaces. The 'Interface Config' mode command is only available on platforms that support independent per-port class of service queue configuration.

Syntax

```
mac access-group <name> in [<1-4294967295>]
no mac access-group <name> in
```

<name> - It uniquely identifies the MAC access list.

<1-4294967295> - The sequence number of this ACL.

no - This command removes a MAC ACL identified by <name> from the interface in a given direction.

Default Setting

None

Command Mode

Global Config, Interface Config

9.23.2.5 access-list

This command creates an Access Control List (ACL) that is identified by the parameter.

Syntax

access-list {(<1-99> {deny | permit} {every | <srcip> <srcm ask>}) | ({<100-199> {deny | permit} {every | {{icmp | igmp | ip | tcp | udp | <number>} any | <srcip> <srcmask> [{eq {<portvalue> | <portkey>}](any | <dstip> <dstmask>) [{eq {<portvalue> | <portkey>}] {[precedence <precedence>] | [tos <tos> <tosmask>] | [dscp <dscp>] [log] [assign-queue <queue-id>] [{mirror | redirect} <slot/port>] [<rule-id>]}}}}}

<accesslistnumber>. The ACL number is an integer from 1 to 199. The range 1 to 99 is for the normal ACL List and 100 to 199 is for the extended ACL List.

permit or deny. The ACL rule is created with two options. The protocol to filter for an ACL rule is specified by giving the protocol to be used like **icmp ,igmp ,ip ,tcp, udp**. The command specifies a source ip address and source mask for match condition of the ACL rule specified by the **srcip and srcmask parameters**. The source layer 4 port match condition for the ACL rule is specified by the *port value p*arameter.

<portvalue> uses a single keyword notation and currently has the values of **domain, echo, ftp, ftpdata, http, smtp, snmp, telnet, tftp,** and **www**. Each of these values translates into its equivalent port number, which is used as both the start and end of a port range. The command specifies a destination ip address and destination mask for match condition of the ACL rule specified by the *dstip* and *dstmask* parameters. The command specifies the TOS for an ACL rule depending on a match of precedence or DSCP values using the parameters **tos, tosmask, dscp**.

Default Setting

None

Command Mode

Global Config

9.23.2.6 no access-list

This command deletes an ACL that is identified by the parameter <*accesslistnumber*> from the system or remove an ACL rule that is identified by the parameter <1-10> from the an IP ACL <accesslistnumber>.

Syntax

no access-list {<1-99> | <100-199>} [<rule-id>]

<rule-id> - To remove a Rule ID.

Note: The ACL number is an integer from 1 to 199. The range 1 to 99 is for the normal ACL List and 100 to 199 is for the extended ACL List.

Default Setting

None

Command Mode

Global Config

9.23.2.7 ip access-group

This command attaches a specified access-control list to an interface. The parameter <name> is the name of the Access Control List.

An optional sequence number may be specified to indicate the order of this IP access list relative to other IP access lists already assigned to this interface and direction. A lower number indicates higher precedence order. If a sequence number is already in use for this interface and direction, the specified access list replaces the currently attached IP access list using that sequence number. If the sequence number is not specified for this command, a sequence number that is one greater than the highest sequence number currently in use for this interface and direction is used.

This command specified in 'Interface Config' mode only affects a single interface, whereas the 'Global Config' mode setting is applied to all interfaces.

Syntax

```
ip access-group {<1-199> | <name>} in [<1-4294967295>]
no ip access-group {<1-199> | <name>} in
```

<1-199> The identifier of this ACL.

<name> The identifier of this ACL.

<1-4294967295> The sequence number of this ACL.

no - This command removes a ACL by identifier or name from the interface in a given direction.

Default Setting

None

Command Mode

Global Config, Interface Config

9.23.2.8 ip access-list

Use this command to create an extended IP Access Control List (ACL) identified by <name>, consisting of classification fields defined for the IP header of an IPv4 frame. The <name> parameter is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the IP access list.

If an IP ACL by this name already exists, this command enters IPv4-Access_List config mode to allow updating the existing IP ACL.

The CLI mode changes to IPv4-Access-List Configuration mode when you successfully execute this command.

Syntax

```
Ip access-list <name>
no ip access-list <name>
```

no - This command removes the IP ACL identified by <name> from the system.

Default Setting

None

Command Mode

Global Config

9.23.2.9 ip access-list rename

Use this command to change the name of an IP Access Control List (ACL). The <name> parameter is the names of an existing IP ACL. The <newname> parameter is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the IP access list.

Syntax

```
ip access-list rename <name> <newname>
```

Default Setting

None

Command Mode

Global Config

9.24 CoS Commands

9.24.1 Show Commands

9.24.1.1 show queue cos-map

This command displays the current Dot1p (802.1p) priority mapping to internal traffic classes for a specific interface. The slot/port parameter is optional and is only valid on platforms that support independent per-port class of service mappings. If specified, the 802.1p mapping table of the interface is displayed. If omitted, the most recent global configuration settings are displayed.

Syntax

show queue cos-map <slot/port>

<slot/port> The interface number.

Default Setting

None

Command Mode

Privileged EXEC, User EXEC

Display Message

The following information is repeated for each user priority.

User Priority: The 802.1p user priority value.

Traffic Class: The traffic class internal queue identifier to which the user priority value is mapped.

9.24.1.2 show queue ip-dscp-mapping

This command maps an IP DSCP value to an internal traffic class. The <ipdscp> value is specified as either an integer from 0 to 63, or symbolically through one of the following keywords: af11, af12, af13, af21, af22, af23, af31, af32, af33, af41, af42, af43, be, cs0, cs1, cs2, cs3, cs4, cs5, cs6, cs7, ef.

The <trafficclass> values can range from 0-6, although the actual number of available traffic classes depends on the platform.

Syntax
show queue ip-dscp-mapping

Default Setting

None

Command Mode

Privileged EXEC

Display Message

IP DSCP: Displays IP DSCP value.

Traffic Class: Displays the queue mapping.

9.24.1.3 show queue trust

This command displays the current trust mode setting for a specific interface. The slot/port parameter is optional and is only valid on platforms that support independent per-port class of service mappings. If specified, the port trust mode of the interface is displayed. If omitted, the port trust mode of each interface in the system is shown. If the platform does not support independent per-port class of service mappings, the output represents the system-wide port trust mode used for all interfaces.

Syntax

show queue trust [<slot/port>]

<slot/port> The interface number.

Default Setting

None

Command Mode

Privileged EXEC, User EXEC

Display Message

Class of Service Trust Mode: The trust mode of this interface.

Non-IP Traffic Class: The traffic class used for non-IP traffic. This is only displayed when the COS trust mode is set to either 'trust ip-dscp' or 'trust ip-precedence'.

Untrusted Traffic Class: The traffic class used for all untrusted traffic. This is only displayed when the COS trust mode is set to 'untrusted'.

9.24.1.4 show queue cos-queue

This command displays the class-of-service queue configuration for the specified interface. The slot/port parameter is optional and is only valid on platforms that support independent per-port class of service mappings. If specified, the class-of-service queue configuration of the interface is displayed. If omitted, the most recent global configuration settings are displayed.

Syntax

show queue cos-queue [<slot/port>]

<slot/port> The interface number.

Default Setting

None

Command Mode

Privileged EXEC

Display Message

Interface: This displays the slot/port of the interface. If displaying the global configuration, this output line is replaced with a Global Config indication.

Interface Shaping Rate: The maximum transmission bandwidth limit for the interface as a whole. It is independent of any per-queue maximum bandwidth value(s) in effect for the interface. This is a configured value.

The following information is repeated for each queue on the interface.

Queue Id: An interface supports n queues numbered 0 to (n-1). The specific n value is platform dependent.

Minimum Bandwidth: The minimum transmission bandwidth guarantee for the queue, expressed as a percentage. A value of 0 means bandwidth is not guaranteed and the queue operates using best-effort. This is a configured value.

Scheduler Type: Indicates whether this queue is scheduled for transmission using a strict priority or a weighted scheme. This is a configured value.

Queue Mgmt Type: The queue depth management technique used for this queue, either tail drop or weighted random early discard (WRED). This is a configured value.

9.24.2 Configuration Commands

9.24.2.1 queue cos-map

This command maps an 802.1p priority to an internal traffic class on a "per-port" basis.

Syntax

```
queue cos-map < priority > < queue-id >
no queue cos-map
```

< priority > - The range of queue priority is 0 to 7.

< queue-id> - The range of mapped traffic class is 0 to 7.

no - Reset to the default mapping of the queue priority and the mapped traffic class.

i The range of mapped traffic class is 0 to 6 for the stackable connection blade.

Default Setting

None

Command Mode

Interface Config.

This command maps an 802.1p priority to an internal traffic class for a device.

Syntax

```
queue cos-map all <priority> <queue-id >
no queue cos-map all
```

<priority> - The range of queue priority is 0 to 7.

<queue-id> - The range of mapped traffic class is 0 to 7.

no - Reset to the default mapping of the queue priority and the mapped traffic class.

The range of mapped traffic class is 0 to 6 for the stackable connection blade.

Default Setting

None

Command Mode

Global Config.

9.24.2.2 queue ip-dscp-mapping

This command maps an IP precedence value to an internal traffic class for a device.

Syntax

```
queue ip-dscp-mapping <ipdscp> <queue-id>
no queue ip-dscp-mapping
```

<ipdscp> - The IP DSCP value in the range of 0 to 63 or an IP DSCP keyword (af11, af12, af13, af21, af22, af23, af31, af32, af33, af41, af42, af43, be, cs0, cs1, cs2, cs3, cs4, cs5, cs6, cs7, ef).

<queue-id> - The range of mapped traffic class is 0 to 7.

no - Reset to the default mapping of the IP DSCP and the mapped traffic class.

i The range of mapped traffic class is 0 to 6 for the stackable connection blade.

Default Setting

None

Command Mode

Global Config.

9.24.2.3 queue trust

This command sets the class of service trust mode of an interface. The mode can be set to trust one of the Dot1p (802.1p), IP Precedence.

Syntax

```
queue trust {dot1p | ip-dscp | untrusted}
no queue trust
```

no - This command sets the interface mode to default.

Default Setting

None

Command Mode

Interface Config.

This command sets the class of service trust mode for all interfaces. The mode can be set to trust one of the Dot1p (802.1p), IP Precedence.

Syntax

```
queue trust all {dot1p | ip-dscp | untrusted}
no queue trust all
```

no - This command sets the class of service trust mode to default for all interfaces.

Default Setting

None

Command Mode

Global Config.

9.24.2.4 queue cos-queue min-bandwidth

This command specifies the minimum transmission bandwidth guarantee for each interface queue.

Syntax

```
queue cos-queue min-bandwidth <bw-0> <bw-1> … <bw-6>
no queue cos-queue min-bandwidth
```

<bw-0> <bw-1> … <bw-6> - Each Valid range is (0 to 100) in increments of 5 and the total sum is less than or equal to 100.

no - This command restores the default for each queue's minimum bandwidth value.

Default Setting

None

Command Mode

Interface Config.

This command specifies the minimum transmission bandwidth guarantee for each interface queue in the device.

Syntax

```
queue cos-queue min-bandwidth all <bw-0> <bw-1> … <bw-6>
no queue cos-queue min-bandwidth all
```

<bw-0> <bw-1> … <bw-6> - Each Valid range is (0 to 100) in increments of 5 and the total sum is less than or equal to 100.

no - This command restores the default for each queue's minimum bandwidth value in the device.

Default Setting

None

Command Mode

Global Config.

9.24.2.5 queue cos-queue strict

This command activates the strict priority scheduler mode for each specified queue on a "per-port" basis.

Syntax

```
queue cos-queue strict <queue-id-0> [<queue-id-1> … <queue-id-7>]
no queue cos-queue strict <queue-id-0> [<queue-id-1> … <queue-id-7>]
```

no - This command restores the default weighted scheduler mode for each specified queue on a "per-port" basis.

i The range of mapped traffic class is 0 to 6 for the stackable connection blade.

Default Setting

None

Command Mode

Interface Config.

This command activates the strict priority scheduler mode for each specified queue on a device.

Syntax

```
queue cos-queue strict all <queue-id-0> [<queue-id-1> … <queue-id-7>]
no queue cos-queue strict all <queue-id-0> [<queue-id-1> … <queue-id-7>]
```

no - This command restores the default weighted scheduler mode for each specified queue on a device.

The range of mapped traffic class is 0 to 6 for the stackable connection blade.

Default Setting

None

Command Mode

Global Config.

9.24.2.6 queue cos-queue traffic-shape

This command specifies the maximum transmission bandwidth limit for the interface as a whole. Also known as rate shaping, this has the effect of smoothing temporary traffic bursts over time so that the transmitted traffic rate is bounded.

Syntax

```
queue cos-queue traffic-shape <bw>
no queue cos-queue traffic-shape
```

<bw> - Valid range is (0 to 100) in increments 5.

no - This command restores the default shaping rate value.

Default Setting

None

Command Mode

Interface Config.

This command specifies the maximum transmission bandwidth limit for all interfaces. Also known as rate shaping, this has the effect of smoothing temporary traffic bursts over time so that the transmitted traffic rate is bounded.

Syntax

```
queue cos-queue traffic-shape all <bw>
no queue cos-queue traffic-shape all
```

<bw> - Valid range is (0 to 100) in increments 5.

no - This command restores the default shaping rate value for all interfaces.

Default Setting

None

Command Mode

Global Config.

9.25 Stacking Commands

9.25.1 Show Commands

9.25.1.1 show switch

This command displays information of the stack members in the stack system. This command is only available for Ethernet Connection Blade with stacking feature.

Syntax
show switch [<unit>]

Default Setting

None

Command Mode

Privileged Exec

Display Message

SW#: Displays the ID of the unit. The maximum number of units allowed in the stack is 8.

ID: Displays the identifier of the unit which is used to identify an interface on that IBP.

Role: This field indicates whether the unit is a stack master or stack member.

- Mgmt Switch
- Stack Member
- Unassigned

Standby Status: Display the standby status of the switch.

- Oper Standby
- Cfg Standby

Mac Address: Displays the MAC address of the IBP.

Priority: Displays the priority of the IBP is range from 0 to 15, unassigned or disabled.

Current Status: Displays the status of the IBP.

- Ready
- Not Ready
- Unsupported
- Code Mismatch
- Config Mismatch
- Not Present
- Code Updating

Version: This field indicates the detected version of code on this unit.

9.25.1.2 show switch stack port

This command displays information of the stack port of stack members in the stack system. This command is only available for Ethernet Connection Blade with stacking feature.

Syntax

show switch stack-port

Default Setting

None

Command Mode

Privileged Exec

Display Message

Unit: Displays the unit.

Interface: Displays the stackable interfaces on the given unit.

Configured Stack Mode: Displays the configured mode for the given interface. Currently, only N/A is displayed.

Running Stack Mode: Displays the run-time mode of the stackable interface.

Link Status: Displays the link status (UP/DOWN) of the stacking port.

Link Speed (Gb/s): Displays the maximum speed of the stacking port.

9.25.1.3 show stack port counter statistic

This command displays statistic of the stacking port. This command is only available for Ethernet Connection Blade with stacking feature.

Syntax
show switch stack-port counters [detailed]

Default Setting

None

Command Mode

Privileged Exec

Display Message

Unit: Displays the unit.

Interface: Displays the stackable interfaces on the given unit.

Transmit and Receive statistics

Data Rate (Mb/s): Displays the approximate rate on the stacking port.

Error Rate (Errors/s): Displays an approximate error rate on the stack port.

Total Errors: Displays the total number of errors since boot. The counter may wrap.

9.25.2 Configuration Commands

9.25.2.1 Configure priority of a switch

This command uses to configure the priority of an IBP. IBP has higher priority will have a better chance to become stack master in a stack system.

Syntax

```
switch <unit> priority <0-15>
no switch <unit> priority
```

<unit> - unit number of an IBP which is range from 1 to 8.

<0-15> - priority value is range from 0 to 15.

no - This command resets the priority value to unassigned.

Default Setting

Unassigned

Command Mode

Global Config

9.25.2.2 switch provision

This command uses to configure a new IBP. User can pre-configure this IBP before the physical IBP is joined to the stack system.

Syntax

```
switch <unit> provision [<name>]
no switch <unit> provision
```

<unit> - unit number of an IBP which is range from 1 to 8.

<name> - name of a provisional switch.

no - This command remove the configuration of this IBP.

Default Setting

None

Command Mode

Global Config

9.25.2.3 Moving management control from one IBP to another

This command is used to move the management IBP from one to another.

Syntax

```
switch movemanagement <fromunit> <tounit>
```

<fromunit> - unit number of an IBP which is range from 1 to 8.

<tounit> - unit number of an IBP which is range from 1 to 8.

Default Setting

None

Command Mode

Global Config

9.25.2.4 Configuring a standby switch

This command is used to configure a standby switch for a stack.

Syntax

```
switch standby <unit>
```

<unit> - unit number of a switch which is range from 1 to 8.

Default Setting

None

Command Mode

Global Config

9.25.2.5 Performing a failover to the standby switch

This command is used to perform a failover and transfer the stack master to the standby switch.

Syntax

switch failover

Default Setting

None

Command Mode

Global Config

The original stack master will be reloaded after performing a failover and rejoin to the stack.

10 Using SNMP

SNMP (Simple Network Management Protocol) is a communication protocol designed specifically for managing devices or other elements on a network. Equipment commonly managed with SNMP includes IBP(s), routers and host computers. SNMP is typically used to configure these devices for proper operation in a network environment, as well as to monitor them to evaluate performance or detect potential problems.

To access this IBP from a network management station using SNMP, follow these steps:

1. Install an SNMP management application on your host computer.
2. Verify that the management station and IBP are configured to the same IP domain.
3. Configure the community name and access rights for network management access via SNMP.
4. To receive trap messages from the IBP, you must specify the IP address of the trap managers, associated community names, and trap types that the IBP will generate.
5. An SNMP management station can configure and monitor network devices by setting or reading device variables specified in the Management Information Base (MIB). The key MIB groups supported by this IBP are listed in this appendix.

To monitor device status or modify system parameters on the IBP from a network management system, you must access the appropriate MIB variables via your SNMP management application.

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10.1 Supported MIBs

The standard MIBs are listed in the following table.

Specifications	Public MIB NAME	MIB FIles
IEEE 802.1x	IEEE8021-PAE-MIB	dot1x.my
IEEE 802.3ad	LAG-MIB	dot3ad.my
RFC 1213	RFC1213-MIB	mib-2.my
RFC 2011	IP-MIB	RFC2011 ip-icmp.my
RFC 1493	BRIDGE-MIB	bridge.my
RFC 1643	ETHERLIKE-MIB	etherlike.my
RFC 1907	SNMPv2-MIB	v2-mib.my
RFC 2233	IF-MIB	if.my
RFC 2571	SNMP-FRAMEWORK-MIB	v3-arch.my
RFC 2572	SNMP-MPD-MIB	v3-mpd.my
RFC 2573	SNMP-TARGET-MIB	v3-tgt.my
RFC 2574	SNMP-USER-BASED-SM-MIB	v3-usm.my
RFC 2575	SNMP-VIEW-BASED-ACM-MIB	v3-acm.my
RFC 2576	SNMP-COMMUNITY-MIB	coex.my
RFC 2618	RADIUS-AUTH-CLIENT-MIB	radius_auth_client.my
RFC 2620	RADIUS-ACC-CLIENT-MIB	radius_acc_client.my
RFC 2674	P-BRIDGE-MIB	pbridge.my vlan.my
	Q-BRIDGE-MIB	
RFC 2737	ENTITY-MIB	entity.my
RFC 2819	RMON-MIB	rmon.my
RFC 3289	DIFFSERV-MIB DIFFSERV-DSCP-TC	diffserv.my, diffserv_dscp_tc.my
RFC 2932	IANA-RTPROTO-MIB	rtproto.my
RFC 2668	MAU-MIB	rfc2668.my
RFC 2213	INTEGRATED-SERVICES-MIB	intserv.my
RFC 3291	INET-ADDRESS-MIB	inetaddress.my
RFC 1573	IANAifType-MIB	iftype.my
RFC 2677	IANA-ADDRESS-FAMILY-NUMBERS-MIB	ianaaddr.my

The private enterprise MIB is listed below.

Private MIB names	**MIB files**
FSC-SWITCH-MIB	fscref.my
OUTBOUNDTELNET-PRIVATE-MIB	telnet.my
MGMT-SECURITY-MIB	mgmt_security.my
DENIALOFSERVICE-PRIVATE-MIB	dos.my
COS-MIB	qos_cos.my
QOS-MIB	qos.my
QOS-ACL-MIB	qos_acl.my
QOS-DIFFSERV-EXTENSIONS-MIB	qos_diffserv_extensions.my
QOS-DIFFSERV-PRIVATE-MIB	qos_diffserv_private.my
RADIUS-CLIENT-PRIVATE-MIB	radius.my
RADIUS-ACC-CLIENT-MIB	radius_acc_client.my
RADIUS-AUTH-CLIENT-MIB	radius_auth_client.my
TACACS-CLIENT-MIB	tacacsclient.my
INVENTORY-MIB	inventory.my
LOGGING-MIB	logging.my
SNTP-CLIENT-MIB	sntp.my
SWITCHING-MIB	switching.my
PORTSECURITY-PRIVATE-MIB	portsecurity.my
SWITCHING-EXTENSION-MIB	switching_extension.my

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10.2 Accessing MIB Objects

MIB objects represent features of the IBP that an SNMP application can control and manage. One example is the RFC-2233 IF-MIB group which you can use to get or set the port configuration by reading or writing to different variables in this MIB group. The variables supported by this group are listed in the following table.

RFC 2233 IF-MIB		
interfaces		
ifNumber	*Yes	*RO
ifMIBObjects		
ifTableLastChange	*No	RO
ifStackLastChange	No	RO
ifTable	**Index:**	**ifIndex**
ifDescr	Yes	RO
ifType	Yes	RO
ifMtu	Yes	RO
ifSpeed	Yes	RO
ifPhysAddress	Yes	RO
ifAdminStatus	Yes	*RW
ifOperStatus	Yes	RO
ifLastChange	Yes	RO
ifInOctets	Yes	RO
ifInUcastPkts	Yes	RO
ifInNUcastPkts	Yes	RO
ifInDiscards	Yes	RO
ifInErrors	Yes	RO
ifInUnknownProtos	No	RO
ifOutOctets	Yes	RO
ifOutUcastPkts	Yes	RO
ifOutNUcastPkts	Yes	RO
ifOutDiscards	No	RO
ifOutErrors	Yes	RO
ifOutQLen	No	RO
ifSpecific	No	RO
ifXTable	**Index:**	**ifIndex**
ifName	Yes	RO
ifInMulticastPkts	Yes	RO
ifInBroadcastPkts	Yes	RO
ifOutMulticastPkts	Yes	RO
ifOutBroadcastPkts	Yes	RO

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ifHCInOctets	Yes	RO
ifHCInUcastPkts	Yes	RO
ifHCInMulticastPkts	Yes	RO
ifHCInBroadcastPkts	Yes	RO
ifHCOutOctets	Yes	RO
ifHCOutUcastPkts	Yes	RO
ifHCOutMulticastPkts	Yes	RO
ifHCOutBroadcastPkts	Yes	RO
ifLinkUpDownTrapEnable	Yes	RW
ifHighSpeed	Yes	RO
ifPromiscuousMode	Yes	RO
ifConnectorPresent	Yes	RO
ifAlias	No	RW
ifCounterDiscontinuityTime	Yes	RO
ifStackTable	**Indicies:**	**ifStackHigherLayer, ifStackLowerLayer**
ifStackStatus	No	*RC
ifRcvAddressTable	**Indicies:**	**ifIndex, ifRcvAddressAddress**
ifRcvAddressStatus	No	RC
ifRcvAddressType	No	RC
ifTestTable	**Index:**	**ifIndex**
ifTestId	No	RW
ifTestStatus	No	RW
ifTestType	No	RW
ifTestResult	No	RO
ifTestCode	No	RO
ifTestOwner	No	RW

***Note:**

Yes - Supported

No - Unsupported

RW - Read/Write

RO - Read only

RC - Read/Create

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10.3 Supported Traps

SNMP traps supported include the following items:

RFC No	Title
RFC 1215	coldStart warmStart linkDown linkUp authenticationFailure
RFC 2819	risingAlarm fallingAlarm